

**Status Review Update for Coho Salmon (*Oncorhynchus kisutch*)
from the Central California Coast and the California portion of
the Southern Oregon/Northern California Coasts Evolutionarily
Significant Units**

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12 April 2001
(revision¹)

¹ This document was originally printed on 31 March 2001. This revised version contains the completed appendices as well as a few minor editorial changes to the text; no substantive changes were made.

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SUMMARY

Coho salmon (*Oncorhynchus kisutch*) data in California were reviewed to provide an update of its status. This review was based only on biological information and uses the “best available data” to analyze the current condition of this species. The geographical area covered includes the Central California Coast ESU and the California portion of the Southern Oregon/Northern California Coasts ESU. In previous status reviews, findings were that the Central California Coast ESU was presently in danger of extinction and that the Southern Oregon/Northern California Coasts ESU was likely to become endangered in the foreseeable future.

Two general types of data were analyzed: presence-absence data and population trend data. Presence-absence data included in the analysis were collected using a number of different sampling techniques over different periods of time between 1989 and 2000. It is important to note that a record of “presence” does not necessarily indicate persistent populations. Nor does a record of “absence” preclude the possibility of coho salmon within the system, only that they were not detected during sampling. Population trend data came from a wide variety of sampling methods including juvenile surveys, downstream migrant trapping, upstream migrant trapping, and spawning and redd surveys. For the trend analysis, we used population data only from streams where a minimum of six years of sampling had been conducted at the same location and using consistent methods. This was done so that the analysis would include at least two complete cycles of the coho life history.

The percentage of sampled streams for which coho salmon were found to be present declined over the 1989-2000 time period, with greater declines occurring in the southern part of the range. In the Central California Coast ESU, coho historical presence was identified in 278 streams. The percentage of these streams for which presence has been detected at least once during the three-year period has remained relatively constant (between 44% and 48%) through time, the notable exception being the 1995-1997 period, when 61% of the surveyed streams were found to have coho salmon. In the California portion of the Southern Oregon/Northern California Coasts ESU, the percentage of streams with coho present was higher than the Central California Coast ESU, but declined from 1989 to 2000. Because of the substantial difference in the number of streams included in the analysis, these results are not directly comparable to those presented in Brown and Moyle (1991).

Population trend data indicate a general downward trend throughout the state, though there is some variation among streams. In the Central California Coast ESU, abundances in the 1990's were clearly lower than in the mid-to-late 1980's. The values of coho replacement rates (CRR) were less than one for 126 of 229 observations, indicating a significantly ($p = 0.0045$) higher likelihood that abundance decreased rather than increased. The 1996 and to a lesser degree 1997 year classes were clearly strong ones. This is relevant because the BRT conclusions were based largely on data collected in those years. In the California portion of the Southern Oregon/Northern California Coasts ESU, there appears to be a general decline in abundance, but trend data are more limited in this area and there is variability among streams and years. Here, the value of CCR was less than one for 40 of 67 observations, which was significantly ($p = 0.0278$) higher than expected based on a probability of 0.5.

Levels of hatchery production of coho salmon in California are much lower than in Oregon and Washington. In the Central California Coast ESU, coho hatchery production has decreased with Warm Springs Hatchery being converted into a captive broodstock facility and Monterey Bay Salmon and Trout unable to get sufficient numbers of fish for broodstock in recent years. Only the Noyo Station program is still consistently in operation but has missed production years. In the California portion of the Southern Oregon/Northern California Coasts ESU, Trinity River Hatchery maintains large production and is thought to create significant straying to natural populations. Irongate and Rowdy Creek Hatcheries has experienced low numbers of returns and therefore limited production.

This status review update agrees with previous BRT conclusions. The Central California Coast ESU is presently in danger of extinction. The condition of coho salmon populations in this ESU is worse than indicated by previous reviews. The California portion of the Southern Oregon/Northern California Coasts ESU is likely to become endangered in the foreseeable future.

INTRODUCTION

Previous status reviews for coho salmon (*Onchorhynchus kisutch*) in California have noted the lack of long-term data for assessing population trends for coho salmon in the state (Moyle et al. 1994; Weitkamp et al. 1995; Schiewe 1996). The decline in salmon abundance and the subsequent listing of coho salmon as “threatened” under the Endangered Species Act (ESA) in two Evolutionarily Significant Units (ESUs) in California has prompted an increase in the amount of monitoring of coho populations over the last six to eight years. Although there remains a limit on the ability to directly compare current population abundance with historical abundance, the availability of consistently gathered survey data and hence the ability to track coho salmon status has increased in the last several years.

The purpose of this document is to provide an updated review of coho salmon status in California, focusing on data collected over the last twelve years. This review is based on “best available data,” but there are still sources of data that were unavailable to the Southwest Fisheries Science Center (SWFSC). The review considers only biological data and not habitat quality. The conclusions herein represent the consensus of opinion by SWFSC biologists that have been active in the Biological Review Team (BRT) process.

This analysis covers those areas of the coho salmon’s historical range that lie within the Central California Coast ESU and the California portion of the Southern Oregon/Northern California Coasts ESU. The Central California Coast ESU extends from the San Lorenzo River in Central California to Punta Gorda in Northern California, including tributaries to San Francisco Bay, but excluding populations from the Sacramento-San Joaquin River system. Coho salmon have occasionally been observed in streams south of the San Lorenzo River, including two confirmed reports in Aptos Creek (Patrick Colson, CDFG, pers. comm.). Whether these reports are isolated cases of straying or successful re-establishment of populations in this creek is not known. There are also anecdotal historical reports of coho salmon in the Big Sur and Carmel Rivers (Hassler et al. 1991). These populations are considered part of the Central California Coast ESU if they are not the result of stock transfers (Weitkamp et al. 1995). The Southern Oregon/Northern California Coasts ESU extends from Punta Gorda to Cape Blanco in southern Oregon, inclusive of the Klamath-Trinity River system (Weitkamp et al. 1995). For this ESU, we considered only streams within California, including tributaries to rivers that enter the ocean north of the Oregon border (i.e., the Illinois and Winchuk Rivers).

LISTING HISTORY

In 1993, the National Marine Fisheries Service (NMFS) received a petition to list coho salmon in Scott and Waddell creeks as a threatened or endangered species from the Santa Cruz County Planning Department (Bryant 1994). In 1994, NMFS announced its determination that coho salmon from Scott and Waddell creeks do not constitute an ESA species (i.e., distinct population segment) and that a listing was not warranted (NMFS 1994). However, as a result of this and other petitions to list local stocks of coho salmon, NMFS initiated a coastwide review of coho salmon status (NMFS 1993).

Coho salmon data were reviewed by the BRT in the original status review (Weitkamp et al. 1995) and again after the one-year comment period, considering new data submitted during that time (Schiewe 1996, 1997). The BRT concluded that coho salmon in the Central California Coast ESU were presently in danger of extinction and that coho salmon in the Southern Oregon/Northern California Coasts ESU were likely become endangered in the foreseeable future. These decisions were largely based on presence/absence data for coho salmon in streams where they had historically occurred as described in Brown and Moyle (1991) and Adams et al. (1999). Subsequently, the Central California Coast coho ESU was listed as threatened on Oct. 13, 1996 and the Southern Oregon/Northern California Coasts coho ESU was listed as threatened on May 6, 1997.

METHODS

Presence-Absence Analysis

Historical Presence

We compiled a list of streams for which there was historical evidence of coho salmon presence using a variety of published and unpublished sources. Principle among published sources were the reviews of Brown and Moyle (1991), Hassler et al. (1991), Ellis (1997), Adams et al. (1999), and Kier Associates (1999). These reviews in turn drew heavily on several key sources including Cherr and Griffen (1979a,b,c,d,e,f), Boberg and Kenyon (1979a,b,c,d), and Mills (1983). Additional unpublished information was obtained from agency biologists, scientists, private landowners, water districts, nonprofit groups, and consultants.

The list of streams with historical evidence of coho salmon presence is provided in Appendix A. We chose to organize the list geographically as follows. River basins are listed from north to south according to where the eventual outlet stream or river enters the Pacific Ocean. Within a basin, tributary streams and rivers are listed in the order that they enter the mainstem as one moves upstream from the river mouth. A similar hierarchy was employed for tributaries, with streams listed in order from mouth to headwaters. Where a river splits into two or more major forks, we listed the north or west fork first followed by the south or east fork. This geographic arrangement was chosen to reduce confusion that has occurred in past reviews where multiple streams with the same name occur in the same watershed.

Current Present-Absence

For each stream on the historical list, we attempted to find any available information on coho salmon presence or absence based on surveys conducted from 1989 to 2000, which, given the coho three-year life cycle typical in California, covers the last four generations. Data were gathered from a variety of sources including published literature, unpublished reports, unpublished data and personal communications from agencies, tribes, private landowners, and nonprofit groups. Survey methods used by various sources included electrofishing, snorkeling, downstream or upstream migrant traps, spawning surveys, and carcass counts.

For each stream, we recorded whether coho salmon were observed (present) or not (absent) in each year that a survey was conducted. Interpretation of these data should be tempered by several facts. First, a record of “presence” indicates that at least one individual representing one or more life stages (e.g., young-of-the-year [YOY], yearlings, or adults) was observed during that particular year. For adult surveys that spanned portions of two calendar years were listed as occurring in the first year (i.e., spawners observed in the 1999-2000 spawning season were listed as present in 1999 but not necessarily 2000).

Second, although records of presence definitively establish that coho salmon occurred at a particular site, it does not necessarily mean that populations are persistent. In more than one instance, we were informed by researchers that coho salmon were absent from streams in the fall where they had been previously observed in spring or summer. Nevertheless, we tallied these as “presences” since there was no way to determine whether similar phenomena occurred in other data or in the historical record of presence-absence data. Additionally, it should be noted that our analysis weighs sites equally with respect to presence regardless of the number of fish observed. Thus, while at a coarse level, changes in the percentage of streams with coho present provide some indication of population trends, region-level declines can be masked by the presence of small numbers of fish. Conversely, although we specifically noted where the number of observed fish was small (five or fewer), certain sampling protocols (e.g., sampling of short reaches, or presence/absence surveys where sampling was terminated when coho were found, such as used by Adams et al. [1999] and Kier Associates [1999]) could lead to the appearance of small numbers of fish when in fact they are more abundant.

Finally, it is also important to note that a record of “absence” does not preclude the possibility that fish were present in the system. Many of the sample sites used in the analysis are index reaches of limited length (often 30 m to 100 m) and may not reflect conditions elsewhere in the watershed, though frequently index reaches are selected based on known historic occurrence of fish. Coho salmon are commonly patchily distributed within a watershed, and the occupied area may vary from year to year based on environmental conditions or where adults happen to spawn. As populations become smaller in size, the probability that short index reaches will contain fish is expected to decline. Despite these limitations, the consistent temporal patterns of presence-absence (and abundance) that occur across large areas (whole watersheds and even regionally) suggest that these index reaches do capture gross patterns of presence-absence through time, even if data from individual years at a site may be inaccurate. Presence-absence data for each stream and year are presented in Appendix B.

Analysis

For our analysis, we examine trends in the percentage of streams surveyed that showed coho presence from 1989 to 2000. Data are presented both on an annual basis and as summaries for three-year intervals: 1989-1991, 1992-1994, 1995-1997, and 1998-2000. These temporal blocks are used for two reasons: to encompass the three potential brood lineages in a particular system and to facilitate comparisons with previous analyses. Data are summarized by ESU, as well as by counties and major river basins within ESUs.

Weighted logistic regression was used to synthesize and describe the joint effects of geography and year on the probability that a survey would indicate “presence” of coho salmon. Survey data were roughly aggregated by geography, using county and major drainages to guide classification. The proportion of “presences”, p , in the available data was calculated for each year for each geographic region. We fit the model

$$\text{logit}(p) = (\alpha * t) + (\beta * s) + \delta \quad (1)$$

to the resulting dataset, where the $\text{logit}(p)$ is defined as $\ln(p/(1-p))$, t represents year, g represents space (the geographic “index” of the groups defined in Table 1), and greek letters are the fitted coefficients. We used the number of observations used to calculate a given proportion present to weight the importance of that proportion in the regression.

Population Trends

Current population trends were analyzed for 41 streams in 17 major watersheds in the Central California Coast ESU and 9 streams in 3 major watersheds in the California portion of the Southern Oregon-Northern California ESU. Ideally long-term records (e.g., more than 10 years) of abundance of either adult migrants (or spawners) or outmigrants provide the best information on population trends, though the former can be substantially influenced by ocean harvest. Such records, however, are exceedingly rare in California, and the majority of populations for which these records are available have been substantially influenced by hatchery operations and thus may or may not reflect abundance trends in naturally spawning populations. Where such records exist, we report population numbers and make note of potential biases in the data.

Whereas long-term records of abundance are lacking, a number of monitoring programs were initiated in the 1990s by agencies, tribes, private landowners, water districts, nonprofit groups, and others, and these efforts have resulted in a number of shorter-term records of abundance. The criterion we used for including a stream in this report was a minimum of six years of data for which sample sites and survey methods were consistent over all years. The six-year criterion was chosen to encompass two full generations of coho salmon. The consistency criteria excluded several sites where longer-term records are available, but where comparing numbers among years might lead to erroneous conclusions.

Among the data sets we used, researchers and authors employed a variety of survey and analytical methods, and the robustness of these methods for assessing population trends is highly variable. A brief

discussion of different types of surveys and analyses, as well as their potential limitations and biases, is warranted.

Juvenile surveys

By far the most widely available data on salmonid abundance in California has been generated by juvenile surveys (electrofishing or snorkeling) conducted in rearing habitats. In most cases, data are collected each year at one or more index sites within a stream at approximately the same time of year, usually summer or fall when flows are lowest. Generally, selection of index sites is nonrandom and dictated by ease of access or local knowledge (or presumed knowledge) of fish presence or relative abundance. Additionally, because the same sites are sampled each year, interannual shifts in spatial distribution of coho salmon among years due to random events or changes in habitat resulting from natural or anthropogenic disturbances both can influence the number of fish observed at a particular site. Finally, if time of sampling differs from year to year, then data are confounded by the natural rate of mortality. For all of these reasons, conclusions about population trends based on limited sampling at index reaches should be viewed cautiously.

Abundance information for juveniles was reported in a variety of different units including 1) number of fish per linear distance of stream sampled; 2) number of fish per square meter of habitat (averaged over all habitat types sampled); and 3) expanded population estimates where habitat-specific density is multiplied by available habitat in a stream to obtain an overall population estimate (i.e., number of fish) for the stream. In this report, in all cases, where fish are reported as fish per linear distance of stream (Waddell and Scott creeks in Santa Cruz County, Gazos Creek in San Mateo County, and Redwood Creek in Marin County), these values represent total counts data rather than true density estimates, since no attempt was made to correct for variability in capture efficiency among years. Thus, differences in fish counts may reflect, in part, differences in sampling efficiency due to visibility, stream discharge, or operating efficiency of the electrofisher. Where there was a choice between using density estimates or expanded population estimates, we reported the expanded estimates, provided the expansions accounted for habitat unit types. The reliability of these expanded estimates, however, depends on the fraction of total habitat sampled for fish, and an appropriate distribution of fish sampling sites among the potential habitats.

Downstream migrant trapping

A handful of data sets derived from downstream migrant trap operations were available. We included data only for yearling fish, since numbers of YOY fish caught in migrant traps can fluctuate dramatically for reasons unrelated to population density. Often in these trapping efforts, coho salmon were caught incidentally by researchers collecting data on chinook salmon and steelhead. We used trapping data for trend analysis only if the sampling period consistently encompassed the period in spring when coho are most likely to emigrate—from March to May or June.

Data from outmigrant trapping efforts are most commonly reported in terms of total number of individuals captured. Consequently, assessing trends in abundance is potentially risky, since capture efficiencies vary substantially within and among years as a function of streamflow. Nevertheless, we present these data because they appear to capture gross trends in abundance reasonably well. Where population estimates were calculated (based on mark-recapture estimates of trap efficiency), we used these data rather than fish counts.

Upstream migrant trapping

Traps or weirs for collecting upstream migrant adults provided data for a few streams; however, virtually all of the upstream migrant data included in this report was gathered at facilities associated with hatcheries. Consequently, population trends apparent in these data may or may not reflect trends among wild populations. Additionally, in some cases (e.g., Noyo Egg Collecting Station), adult fish are usually collected only up until the desired number of brood fish is attained. Thus, these counts may

underestimate abundance, particularly in years with high returns. At other locations (e.g., Shasta River), counting of coho salmon was incidental to counting of steelhead or chinook salmon; thus, the numbers presented may represent an incomplete census.

Spawning Surveys and Redd Counts

Spawning surveys for coho salmon were also relatively rare. Because coho typically spawn during periods of high flow, visual observation of coho can be difficult. In the few data sets we found, data were reported as the maximum live/dead count, which is the maximum number of live fish plus carcasses observed on any one survey. Although there are methods for obtaining population estimates from repeated surveys of this type, no such data were available to us.

We also report redd count data from a single watershed (Lagunitas Creek). In general, redd counts tend to underestimate total spawning population; however, like other data types they can provide an index of relative abundance among years. Potential biases in using redd data for trend detection include variable observing conditions among years, superimposed redds, or multiple redds resulting from a single individual.

Analysis

Analysis of population trends is summarized by geographic regions corresponding to those delineated in the presence-absence analysis. Plots of abundance estimates or indices over time are presented for major watersheds and, when possible, for subwatersheds within larger basins. Due to the generally consistent three-year life cycle of female coho salmon in California, comparison of interannual changes in abundance is largely meaningless, since any changes in environmental factors affecting coho populations at annual time scales are confounded by differences between largely independent brood-year lineages. Therefore, we estimated cohort replacement rates (CRR) for each generation of each brood-year lineage for which we had an estimate or index of abundance at year t and year $t+3$. The cohort replacement rate CRR is calculated as the ratio N_{t+3} / N_t , and describes the rate of population growth over a single generation. Values greater than one indicate an increase in abundance; values less than one indicate a decrease in abundance. Cohort replacement rates were calculated only for pairs of data that did not include an abundance estimate or index of zero.

Assuming 1) that populations of coho salmon have exhibited no net change in population size in recent years, and 2) that the method used to estimate abundance within each time series has an equal probability of overestimating or underestimating abundance (or at least that the method of estimating abundance exhibits consistent bias, such that if bias were removed, the assumption of equal probability of overestimation or underestimation would hold), it may be expected that any given estimate of λ has an equal probability of exceeding one or falling below one. To determine if the distribution of cohort replacement rates indicated systematic changes in abundance of coho salmon across cohorts and geography, we tested the null hypothesis that cohort replacement rates did not indicate systematic decline by calculating the probability of observing the number of CRR < 1 in a binomial sample with $\Pr[\text{CRR} < 1] = 0.5$.

RESULTS

Presence/Absence

We found some evidence of coho salmon occurrence in 877 streams in California. The increase in number over the 582 streams reported by Brown et al. (1994) reflects several factors. First, for a number of streams, new historical records have been uncovered since 1991. Additionally, surveying of streams for a number of salmonids has intensified during the 1990s and coho have been found in locations where no previous records were available. Kier Associates (1999) reported records of occurrence in 123

streams not reported in Brown and Moyle (1991) in the Southern Oregon/Northern California Coasts ESU. We also reported coho salmon in streams regardless of the size of the stream or the linear distance of stream accessible to salmon. In several cases, fish were reported near the mouths of streams that were tributary to known coho producing streams. It is quite possible that these fish migrated into these systems from adjacent waters. Finally, while the number of streams listed as potential coho streams here is larger than previously reported, there is no way to be certain how many of these observations of occurrence represent persistent populations of coho and how many are isolated occurrences of straying by coho into streams that typically do not support them.

Overall in California, the percentage of surveyed streams showing coho salmon presence has declined with time (Figure 1). In 1989 and 1990, coho salmon were found in approximately 80 percent of the historical streams surveyed. From 1998 to 2000, that percentage has dropped to between 51 and 66 percent (average 58). Comparison among time intervals should be done with some caution. The number of streams surveyed has varied over the last twelve years, with the greatest percentage of historic streams being surveyed in the 1994, 1995, 1996, and 2000 period. Thus, some of the changes in percentage may be an artifact of increased sampling intensity. It is difficult, however, to gauge the influence of sampling intensity. On one hand, the listing of coho salmon under ESA likely simulated sampling in some habitats not formerly believed to be good coho habitat. On the other hand, much recent monitoring work has focused on those streams that are believed to be the most likely sites to find coho salmon.

A logistic regression analysis indicated a significant relationship between the probability of finding fish present in a stream and both time and geographic index. This relationship is described by the equation:

$$\text{logit}(p) = 2.7027 - (0.1127 * \text{time}) - (0.1456 * \text{geographic_index})$$

The response surface generated suggests that the likelihood of detecting a coho “presence” in streams where they were historically present has decreased throughout California from 1989 to 2000, and that the trend has been more pronounced in the southern part of the range (Figure 2).

Direct comparison of the percentages presented in this report with those in previously published papers for the purpose of analyzing trends through time is not advised. Previous authors have used different criteria for establishing presence (e.g., different time frames, professional judgement rather than direct observation), and the number of streams surveyed has varied widely.

Central California Coast ESU

Overall, we found evidence of historical coho salmon occurrence in 278 streams in the Central Coast ESU. Current (within the last 12 years) presence-absence information for these streams is summarized in three-year time intervals: 1989-1991, 1992-1994, 1995-1997, and 1998-2000 (Table 2). The percentage of these streams for which presence has been detected at least once during the three-year period has remained relatively constant (between 44% and 48%) through time, the notable exception being the 1995-1997 period, when 61% of surveyed streams were found to have coho salmon. This was the most intensively sampled period, with 58 percent of historical coho streams being sampled at least once during the three-year interval, and coincided with the relatively strong year classes of 1996 and 1997. Eighteen fewer streams were sampled in the 1998-2000 period. However, this difference in sampling intensity alone cannot account for the change in percent presence of coho from 1995-1997 to 1998-2000.

Southern Oregon/Northern California Coasts ESU

In the California portion of the Southern Oregon/Northern California Coasts ESU, the percent of streams with coho present in at least one brood year has shown a decline from 1989-1991 to the present. In 1989-1991 and 1992-1995, coho were found in over 80 percent of the streams surveyed. Since then, the percentage has declined to 69 percent in the most recent three-year interval. As with the Central

California Coast ESU, fewer streams were sampled in the most recent interval; however, this again cannot account for the declining trend observed.

Population Trends – Central California Coast ESU

Santa Cruz County, San Mateo County, and San Francisco Bay

Long-term data on the abundance of coho salmon in streams within Santa Cruz and San Mateo counties are limited. Records of adult spawners and outmigrating smolts from Waddell Creek between 1933 and 1942 (Shapovalov and Taft 1954) constitute the only historical record of abundance in the county; there are no current adult data for comparison. Juvenile surveys in Scott and Waddell creeks in Santa Cruz County, and Gazos Creek in San Mateo County have been conducted by Jerry Smith (San Jose State University) since 1992. Surveys have also been conducted regularly in the San Lorenzo River and its tributaries; however, no juvenile coho salmon have been documented since the 1980s (Don Alley, D.W. Alley & Associates, personal communication). We found no systematic surveys of streams in the San Francisco Bay area, where coho appear to be extinct.

Adults

Historical Population Information - Adult coho salmon were enumerated at Waddell Creek weir during the nine-year period between 1933 and 1942 (Shapovalov and Taft 1954). On average, 247 adults passed through the fishway each season (range 84-583). Additionally, an average of 66 adults either passed directly over the dam or spawned in Waddell Creek below the dam; thus, the total spawning population averaged 312 fish during the nine-year period (Figure 3).

Historical information on population sizes of coho salmon in Scott Creek is limited to three years of adult counts from the 1936/1937 to the 1938/1939 spawning seasons (Shapovalov and Taft 1954). During this period, an average of 523 coho (range 374-681) passed through the trapping facility each season (Shapovalov and Taft 1954). These numbers may represent an incomplete census of spawners as the purpose of the study was to examine the proportion of 2- and 3-year old spawners in the population. These historical numbers are complicated by the fact that between 1933 and 1936, an average of 12,215 hatchery juveniles (size unknown) were planted in Scott Creek annually (CDFG 1998).

Current Population Information – No current datasets with six or more years of record are available.

Smolts

Historical Population Information - From 1933 to 1942, the average number of smolts¹ passing downstream through the trap was 2,040 (range 152-4,911)(Figure 4). These counts from Shapovalov and Taft (1954) substantially underestimate total smolt production in the Waddell Creek system. During April and May, the period during which the majority of coho smolts emigrated, only about 25% of the total flow typically was routed through the trap, with the remaining 75% of the flow passing over the dam (Shapovalov and Taft 1954); thus, large numbers of fish passed over the dam without being counted. All smolts moving through the trap were marked; thus, by examining the ratio of marked to unmarked fish in subsequent adult populations, a crude estimate of total population size was gained. Based on these estimates, Shapovalov and Taft (1954) concluded that only about one-third of the smolt population was captured each year. Thus, it is reasonable to assume that average annual smolt production was at least 6,000 fish during the nine years of sampling.

Another piece of circumstantial evidence supports the contention that smolt populations in Waddell Creek were larger by a factor of three or more than the numbers of fish collected in the

¹ Although fish are reported as smolts, about 8% of downstream migrants exited the stream in the period from November to February and were unlikely to have had the physiological morphological characteristics typically associated with smolts.

outmigrant trap. For 2,040 smolts (the nine-year average catch) to produce 313 adults (the average estimated number of spawners during this period), ocean survival would have had to exceed 15%. Such a high ocean survival rate for coho salmon is extremely unlikely, given that even during periods of favorable ocean conditions, marine smolt-to-adult survival of coho salmon typically is 5% or less. If one assumes 5% marine survival for a mean spawning population of 312 fish, the corresponding number of smolts is 6,240—very close to Shapovalov and Taft's (1954) estimates.

Current Population Information – No current datasets with six or more years of record are available.

Juveniles

Historical Population Information - No historical datasets with six or more years of record are available.

Current Population Information - Systematic sampling of juvenile coho salmon in Waddell and Scott Creeks has been conducted in 1988 and then annually from 1992 to the present (Smith 2001a). Gazos Creek has been surveyed annually since 1994. The number of stations surveyed in each of these streams has varied among years and streams. To facilitate interannual comparisons, we considered data only from sites that have been sampled in all years of the time series. Abundance is reported as fish per 100 lineal feet of stream; however, these are simply fish counts rather than population estimates for the habitats sampled; no correction was made to account for capture efficiency.

The data from Waddell, Scott, and Gazos creeks indicate that over the past decade coho were most abundant in 1993, 1996, and 1999 (Figure 5). The 1994/1997/2000 brood lineage appears to have been extirpated from Waddell and Gazos creeks, and is very weak in Scott Creek. Smith (2001b) reported that coho numbers were lower in 2000 than in any of the previous nine years. The 1992/1995/1998 brood lineage is weak in all three streams, but particularly so in Gazos and Waddell Creeks.

Marin County

Adults

Historical Population Information – Adult coho spawner surveys have been conducted sporadically in Lagunitas Creek and its tributaries since the 1950s. Early surveys from 1950-1970 were conducted by California Department of Fish and Game. Although these surveys document distribution and could provide a coarse index of abundance in certain reaches, they are not sufficiently robust to be used in a more detailed assessment of population trends (R. Smith, National Park Service, pers. comm.).

Current Population Information – A more consistent record of redd counts in Lagunitas Creek and three of its tributaries, Olema Creek, Devils Gulch, and San Geronimo Creek is available from 1995 to 2000. The number of redds in these streams has remained fairly constant over the past six years, with the highest accounts occurring in the 1996-97, 1997-98, and 1999-2000 spawning seasons (Figure 6).

Smolts

Historical Population Information – No historical datasets with six or more years of record are available.

Current Population Information – No current datasets with six or more years of record are available.

Juveniles

Historical Population Information – No historical datasets with six or more years of record are available.

Current Population Information – Data on summer juvenile abundance is available for Lagunitas Creek and two of its tributaries for the period from 1993 to 2000. Although population expansions based on density within different habitat types are available for some years, expansions have not been completed

for the 1998-2000 period (E. Ettinger, Marin Municipal Water District, pers. comm.). Thus, only total fish counts are presented here. Both the 1994 and 1997 brood years were relatively strong in Lagunitas Creek and its tributaries; however, the overall trend suggests a decline in abundance (Figure 7). The average abundances (all streams combined) are lower for 1998, 1999, and 2000 than in any of the five preceding years.

Juvenile abundance has also been reported for Redwood Creek in the Golden Gate National Recreation Area for years 1994 to 2000 (Smith 2001b). As with the time series from Waddell, Scott, and Gazos creek, we considered only sites that were sampled every year during that period to provide a consistent index of abundance. The data indicate that the 1995 and 1996 brood years were relatively strong, but that populations have declined since then (Figure 8).

Sonoma County

Long-term records of coho salmon abundance in Sonoma County are exceedingly rare, both historic and current. We found only one site with records meeting our criteria for inclusion in the trend analysis.

Adults

Historical Population Information – No historical datasets with six or more years of record are available.

Current Population Information – No current datasets with six or more years of record are available.

Smolts

Historical Population Information – No historical datasets with six or more years of record are available.

Current Population Information – No current datasets with six or more years of record are available.

Juveniles

Historical Population Information – No historical data with a minimum of six years of data are available.

Current Population Information – Two sites on the Little North Fork Gualala River have been sampled by the California Department of Fish and Game (CDFG) in all years since 1988, except for 1994, 1996, and 1997. Coho salmon were present in the first year of sampling, but have not been reported since (Scott Harris, CDFG, unpub. data).

Although there are scattered electrofishing records in tributaries of the Russian River, we found no datasets that met our criterion of six or more years of consistent record.

Mendocino County

Compared with other regions of California, records of coho salmon abundance in streams entering the ocean in Mendocino County are relatively abundant, though most of these records are fairly recent. We found consistent records for 31 sites in Mendocino County, representing 9 major watersheds (Caspar Creek, Little River, Big River, Usal Creek, Ten Mile River, Pudding Creek, Noyo River, Albion River, and Big Salmon Creek).

Adults

Historical Population Information – No historical datasets with six or more years of record are available.

Current Population Information – No current datasets with six or more years of record are available.

Smolts

Historical Population Information – Downstream migrant traps have been operated annually on Caspar Creek and Little River by the California Department of Fish and Game since 1986. These data are discussed under current population information below. No other long-term records of outmigrating smolts are available for this geographic region.

Current Population Information – The Caspar Creek and Little River downstream migrant traps are rotary screw traps and thus sample only a portion of the water column. Estimates of capture efficiency are only available for the last year of sampling, so values reported are counts of fish, rather than population estimates.

Trends in abundance are similar for both systems. Smolt counts were highest in the first four years of sampling and have declined since, though numbers are somewhat variable (Figures 9 and 10). The 1992/1995/1998 brood lineage appears to be the weakest in both streams, though Caspar Creek shows reasonably strong numbers in 1998.

Juveniles

Historical Population Information – No historical datasets with six or more years of record are available.

Current Population Information – Juvenile abundance surveys have been conducted by both private landowners and the California Department of Fish and Game on a number of streams and rivers in Mendocino County since the late 1980s and early 1990s. Streams surveyed include Usal Creek, Howard Creek, DeHaven Creek, Ten Mile River, Pudding Creek, Noyo River, Caspar Creek, Little River, Albion River, and Big Salmon Creek. In all cases, data are juvenile densities for index reaches; no population expansions are available.

Surveys in three smaller watersheds in the northern part of Mendocino County, Usal Creek, Howard Creek, and DeHaven Creek have yielded few fish in recent years. Usal Creek has been sampled annually since 1993; however, coho salmon were found only in 1993 and 1996 (Figure 11). Howard Creek was surveyed in 1986, 1988-1991, and 1998-1999. Fish were found only in 1988 and 1998. No fish have been found in DeHaven Creek in surveys covering 1993-1995 and 1998-2000. Thus, all three brood lineages in these coastal streams appear weak if not essentially extinct.

Sampling on index reaches on the South Fork of the Ten Mile River indicate that coho numbers have been generally low over the past eight years with 1996 being the notable exception (Figure 12). Of particular concern is the fact that very few fish have been captured in surveys from 1998-2000; a combined total of seven fish have been captured at eight index sites within this time period. Temporal patterns in fish abundance in the North Fork Ten Mile system are very similar, with very low densities of fish in all years except 1996, and a combined total of only nine fish reported over the past three years (Figure 13). The Middle Fork Ten Mile River and its tributaries have shown few coho juveniles since 1993, with modest increases in numbers at a single site in 1997 and 1999 being the only deviations from a general pattern of few or no fish (Figure 14). Only one fish has been reported since 1993 in a tributary to the mainstem Ten Mile River (Campbell Timberland Management, unpub. data).

Index sites on Pudding Creek were sampled annually between 1983 and 1995 (excluding 1990) by the California Department of Fish and Game, and from 1993 to 2000 by Campbell Timberland Management. The CDFG data indicates a decline in abundance after 1989 extending to the last year of sampling (Figure 15). Data from 1993 to 2000 from a second site shows increases in numbers for the 1996 and 1999 brood years; however, overall densities remain low (Figure 16). Because sampling occurred at different sites in these two time series, direct comparison of these densities is inappropriate.

Data from the Noyo River and its tributaries from 1993 to 2000 indicate that, like other Mendocino County rivers to the north, 1996 was a relatively strong year; however, unlike systems to the north, 1995 and 1997 were also comparatively strong years (Figure 17). Abundance decreased in 1998 and 1999, indicating that the strong years in 1995 and 1996 did not carry over into the subsequent generation. A modest increase in numbers was observed in 2000.

Juvenile density data at index sites has been collected by California Department of Fish and Game since 1986 in Caspar Creek and Little River. In both systems, the temporal patterns of abundance are similar. The highest densities of fish were observed from 1986 to 1989, and have generally declined since then (Figures 18 and 19). The relatively strong 1996 year class in the region was reflected in comparatively large numbers of fish in both these systems, though still not approaching numbers from the late 1980s. The years 1992 and 2000 were also moderately strong in Caspar Creek.

Data from two sites on the Big River indicate considerable variation among years, but not obvious trends in abundance. Again the strong 1996 year class observed elsewhere along the coast was evident in Big River surveys, but comparable densities were also observed in 1995, 1997, and 1999 (Figure 20).

Abundance data from index sites in the Albion River and its tributaries were collected annually from 1988 to 1996, and then again in 1999 and 2000. The data suggest a general downward trend from peak abundances in 1992 and 1993, though numbers have remained fairly constant since then (Figure 21). As with most other sites in this ESU, the 1996 year class was the strongest within the last five years.

Big Salmon Creek, the southern-most coho-bearing stream in Mendocino County has been surveyed annually since 1993. Strong years classes were apparent in both 1996 and 1997, much like in the Noyo and Big rivers (Figure 22). Numbers declined to pre-1996 levels in the past three years.

Summary of Central California Coast ESU Trend Data

The vast majority of time series data on coho salmon abundance available for the Central California Coast coho salmon ESU consists of summer density estimates derived from sampling at index sites of relatively short length. Most of these time series are short—six to eight years in duration—but a few extend back into the mid-to-late 1980s. Because of the nature of these data, conclusions must be drawn cautiously. Nevertheless, consistent patterns found in most basins within the ESU suggest that while these data may not be particularly robust in detecting trends within a specific stream reach, they do appear to track large-scale trends in abundance over watersheds and larger geographic areas reasonably well.

Several consistent patterns emerge from these data. Although time series data dating back to the 1980s were available for only three streams (Caspar Creek smolts and juveniles; Little River, smolts and juveniles; and Pudding Creek juveniles), in each case, the abundance in the 1990s was clearly lower than in the mid-to-late 1980s. Thus it is important to consider that variability in abundance observed in the 1990s is potentially variation around population means that are substantially lower than they were historically. It is also clear from the data that 1996 and, to a more limited degree, 1997 were relatively strong year classes compared with other years in the 1990s. This is relevant since the BRT conclusions made in 1996 were in part based on presence-absence information gathered in 1995 and 1996 (Schiewe 1996). Finally, although there is some variability among sites, the general overall trend during the 1990s is one of continued decline. Values of CRR (abundance at time $t+3$ /abundance at time t) for all paired observations of abundance (non-zero values only) are plotted in Figure 23. Overall, 126 of 229 CRR values were less than 1, indicating a significantly ($p = 0.0045$) higher likelihood that abundance decreased rather than increased at a particular site. Were a population increase as likely as a population decrease, and equal number of observations would be expected to fall above and below CRR = 1.

Population Trends – California Portion of Southern Oregon/Northern California ESU

Humboldt County

With the exception of records from the Eel River basin, long-term trend data—either historical or current—for coho salmon in Humboldt County (or Mendocino County streams that eventually enter the ocean in Humboldt County) are scarce. Two historical records of adult fish at Benbow Dam on the South

Fork Eel River and Sweasy Dam on the Mad River provide information on adult run sizes from late 1930s to the mid 1960s (Sweasy) and 1970s (Benbow); however, no current records exist for comparison. Juvenile surveys have been conducted on a number of streams in the 1990s in the Eel River basin. Additional surveys have been conducted in the Redwood Creek, Mad River, and Mattole River watersheds; however, none of these datasets met our criteria of having six or more years of data collected in a consistent fashion.

Adults

Historical Population Information – Numbers of adult coho salmon at Benbow Dam showed a long and general decline from an average of more than 13,000 fish in the 1930s and 1940s (range 7,327 to 25,289) to about 5,700 fish in the 1950s and 1960s (range 1,289 to 14,316), to fewer than 1700 fish in the 1970s (range 509 to 3,993) before the dam and counting facility were removed (Figure 24). At Sweasy Dam, coho adult counts averaged almost 400 fish in the years between 1938 and 1951 (range 73 to 725), before falling to an average of 37 fish in the seven years from 1952-1958 (range 2 to 91) (Figure 25). The population increased dramatically in 1962 and 1963, with the highest recorded counts occurring in those two years. A similar increase was observed in the South Fork Eel River during those years.

Current Population Information – No current datasets with six or more years of record are available.

Smolts

Historical Population Information – No historical datasets with six or more years of record are available.

Current Population Information – No current datasets with six or more years of record are available.

Juveniles

Historical Population Information – No historical datasets with six or more years of record are available.

Current Population Information – Summer surveys of coho salmon juveniles have been conducted in a number of index reaches in the South Fork Eel River drainage by both private landowners and California Department of Fish and Game. Data from these surveys indicate no obvious trends in abundance (Figure 26). The 1996 and 1997 year classes were relatively strong, as was the 1999 year class. The 1995, 1998, and 2000 year classes were comparatively weak.

A longer-term data set from two sites in Hollow Tree Creek, a tributary to the South Fork Eel River, indicates a somewhat different pattern. As was seen in Mendocino County, a general decline in abundance has been observed since the late 1980s (Figure 27), and numbers in 1998 through 2000 are lower than for the rest of the 1990s. There is some suggestion in the data that the 1995/1998 brood lineage is the weakest in the South Fork Eel and its tributaries.

A final tributary to the main fork of the Eel River, Ryan Creek has been surveyed by the California Department of Fish and Game since 1986. Coho salmon were found in modest numbers in 1988 and 1989, and lower numbers in 1992. However, no fish have been captured at this site in the last eight years (Scott Harris, CDFG, unpub. data).

Del Norte County

Population trend data for Del Norte County, including the Klamath-Trinity system, are scarce aside from hatchery records. Monitoring of downstream migrants has occurred on two tributaries of the Trinity River (Willow and Horse Linto creeks); however, sampling has targeted other salmonids and the majority of coho salmon have typically migrated before traps are installed in the spring. Additional monitoring programs have been initiated in the Klamath-Trinity system by the Hoopa Valley and Yurok tribes; however, data are available for the past five or fewer years. A limited amount of information is

available on both adults and smolts in the Mill Creek, a tributary to the Smith River, and Wilson Creek, which enters the Pacific Ocean south of the Smith River.

Adults

Historical Population Information – No historical datasets with six or more years of record are available other than hatchery records described in the Artificial Propagation section below.

Current Population Information – Counts of adult spawners have been made annually on the West Branch of Mill Creek in the Smith River basin since 1980. Data reported are the maximum number of live fish and carcasses observed on any one survey. Maximum live/dead counts have ranged from a high of 28 to a low of 2 over the 20 years of record, with no obvious trend through time, though counts have been comparatively low over the past four years (Figure 28). Nor is there any evidence that the variability observed among years is related to the strength or weakness of any particular brood lineages.

A second set of spawning surveys has been conducted on both the west and east branches of Mill Creek and associated tributaries. These show maximum live/dead counts of between 30 and 40 in the period from 1993 to 1996 but counts of less than 11 in all subsequent years (Figure 29).

Smolts

Historical Population Information – No historical datasets with six or more years of record are available.

Current Population Information – Downstream migrant traps have been operated on the East and West Branches of Mill Creek from 1994 to 2000. Although expanded population estimates were provided, a discrepancy in numbers between data provided to us and other published documents led us to present total counts instead. These data suggest a relatively strong year in 1998 (1997 brood year) for both Branches of Mill Creek, and a similarly strong year on West Branch, but not East Branch in 1995 (Figure 30). Overall, it is difficult to discern a specific trend in these data.

Juveniles

Historical Population Information – No historical datasets with six or more years of record are available.

Current Population Information – Surveys of juvenile coho density in summer have been conducted in Wilson Creek since 1995. Population size has dropped precipitously during that time from an estimated population of almost 1400 in 1995 to fewer than 50 fish in 1999 and 2000.

Summary of Southern Oregon/Northern California ESU Trend Data

Current trend data for the California portion of the Southern Oregon/Northern California ESU are less available than for the Central Coast ESU, and we found only one dataset that contained information dating back into the 1980s. Consequently, drawing conclusions about changes in the status of coho salmon in this ESU is more difficult. Nevertheless, analysis of coho replacement rates (CRRs) indicates that a general decline in abundance for those populations analyzed. In 40 of 67 paired observations, the value of CRR was less than one, indicating a decrease in numbers from time t to time $t+3$ (Figure 31). This number was significantly higher than expected ($p = 0.0278$) based on a probability of 0.5.

ARTIFICIAL PROPAGATION

Artificial propagation of coho salmon by state, county, and private hatcheries has a long history in California dating back until at least until the 1890's. Transfer of eggs from other basins including out-of-state sources and out-of-basin releases of hatchery coho were common until 1980's. Even if records

were complete, the impacts of these activities are unknown. Therefore, the best approximation of the potential for hatchery impacts on the natural populations of coho salmon is a review of the relative magnitude and pattern of hatchery operations.

There are currently seven hatcheries producing coho salmon in California. Three of the hatcheries are in the Central California Coast ESU; Monterey Bay Salmon and Trout, Warm Springs, and Noyo Station Hatcheries. Monterey Bay Salmon and Trout Hatchery is a small privately supported operation started in 1976 on Big Creek, a tributary to Scott Creek, Santa Cruz County. There have been hatchery activities in this area since the 1890's. Warm Springs Hatchery is a CDFG-operated mitigation facility started in 1980 on Dry Creek, a tributary to the Russian River, Sonoma County. The Noyo Station Hatchery is a CDFG-operated enhancement facility started in 1962 on the South Fork of the Noyo River, Mendocino County. There are four coho hatcheries in California's portion of the Southern Oregon/Northern California Coasts ESU: Mad River, Trinity River, Irongate, and Rowdy Creek hatcheries. Mad River Hatchery is a CDFG operated enhancement facility started in 1970 on the Mad River, Humboldt County. Trinity River Hatchery is a CDFG operated mitigation facility started in 1958 on the Trinity River, Trinity County. Irongate Hatchery is a CDFG mitigation facility started in 1965 on the Klamath River, Siskiyou County. Rowdy Creek Hatchery is a small privately operated hatchery started in 1972 on Rowdy Creek, a tributary to the Smith River, Del Norte County.

Levels of hatchery production of coho salmon in California are smaller than those in Oregon and Washington and have been declining in recent years. Annual averaged (over a 5-year period, 1987-91) coho hatchery releases for the Central California Coast ESU are less than 0.3 percent of total coastwide hatchery releases of coho salmon. Hatcheries in the California portion of the Southern Oregon/Northern California Coasts ESU account for less than 1 percent of coastwide releases (Weitkamp et. al 1995, Table 5). In recent years, several hatcheries have not produced brood years due to a lack of spawning adults. Monterey Bay Salmon and Trout Hatchery has not produced coho since the 1997 release. Warm Springs Hatchery has terminated their coho program due to lack of returning adults and is planning to use the facility as a captive broodstock operation (Figure 32). Noyo Station and Rowdy Creek Hatcheries were unable to get adults for spawning in year 2000 (Figures 33 and 34). Mad River and Irongate Hatcheries both have reduced numbers of adult returns in recent years (Figures 35 and 36). Only Trinity River Hatchery has been able to maintain production (Figure 37).

In the Central California Coast ESU, hatchery operations are relatively small, but still may have a significant impact due to the small natural populations in the area. These hatchery operations have probably masked the true degree of coho decline in this ESU, but are also probably responsible for the coho's continued existence in the south. In the last ten years, hatchery practices have been limited to within basin stocks which would pose the least threat to genetic integrity. In the Southern Oregon/Northern California Coasts ESU, the principal concern is the large production of the Trinity River Hatchery. Potential outbreeding due to the large numbers of hatchery fish spawning in natural areas poses a significant threat to the genetic integrity of natural populations.

CONCLUSIONS

Central California Coast ESU

The BRT previously concluded that coho salmon stocks south of Punta Gorda are depressed relative to past abundance but that there are limited data to assess population numbers or trends (Weitkamp et al. 1995). Nevertheless, in 1995 the BRT unanimously concluded that natural populations of coho salmon in this ESU were in danger of extinction. In a subsequent status review that considered additional presence-absence information gathered in 1995-1996, it was reported that the percent of streams with coho salmon present was higher than previously estimated (Schiewe 1996). This did not fundamentally alter the BRT's conclusion; a majority of the BRT concluded that coho salmon were in danger of extinction, while a minority concluded that it was not presently in danger of extinction but that it was likely to become so in the foreseeable future.

Collectively, the recent presence-absence and population trend data presented in this report strongly suggest that throughout much of this ESU coho salmon continue to decline. Although the periods of high and low abundance vary somewhat among river basins, the majority show that the 1996 and 1997 brood years were relatively strong compared with years both before and after this period. Consequently, the picture resulting from presence-absence analysis conducted during the 1995-1996 period, which was considered in the decision to list coho as “threatened” in this ESU, may have been overly optimistic. Declines have been observed in several streams (e.g., Scott Creek, Santa Cruz County, and Lagunitas Creek, Marin County) where populations had before been considered relatively stable.

After considering this information, we conclude that the Central California Coast ESU is presently in danger of extinction.

California Portion of the Southern Oregon/Northern California Coasts ESU

The BRT previously concluded that coho salmon stocks between Punta Gorda, California, and Cape Blanco, Oregon are depressed relative to historical abundance, but again there was limited information from which to assess population abundance or trends (Weitkamp et al. 1995). They concluded that coho salmon in this ESU were not in danger of extinction, but were likely to become endangered in the foreseeable future. Subsequent status reviews (Schiewe 1996, 1997) concluded that more recent presence-absence information for the California portion of this ESU showed a lower percentage of streams with coho present than earlier reviews. However, their conclusion regarding the overall status of the ESU remained essentially unchanged.

Both the presence-absence and trend data presented in this report suggest that many coho salmon populations in this ESU continue to decline. Presence-absence information from the past twelve years indicates fish have been extirpated or at least reduced in numbers sufficiently to reduce the probability of detection in conventional surveys. Unlike the Central California Coast ESU, the percentage of streams in which coho were documented did not experience a strong increase in the 1995-1997 period. Population trend data were less available in this ESU, nevertheless, for those sites that did have trend information, evidence suggests declines in abundance.

After considering this information, we conclude that the Southern Oregon/Northern California Coasts ESU is presently not at risk of extinction, but is likely to become endangered in the foreseeable future. The conclusion is tempered by the fact that population trend data was limited, and further analysis may reveal declines sufficient to conclude that the California portion of this ESU is in danger of extinction.

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FIGURES

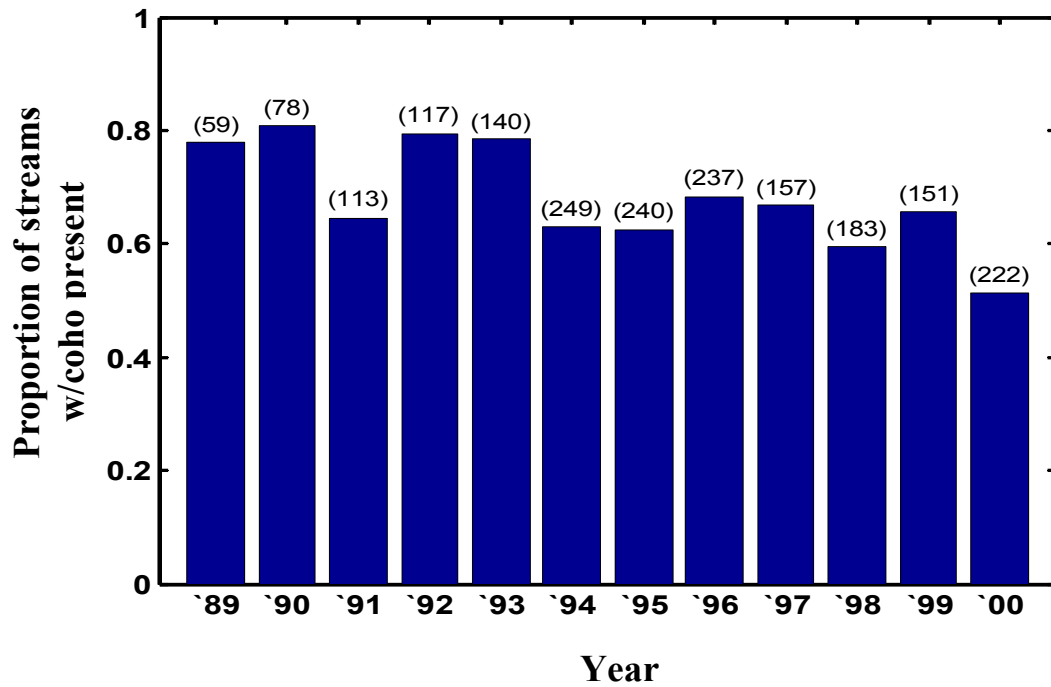


Figure 1. Percentage of historical coho salmon streams surveyed showing presence in years 1989 through 2000. Values indicate the number of sites that were surveyed for the particular year.

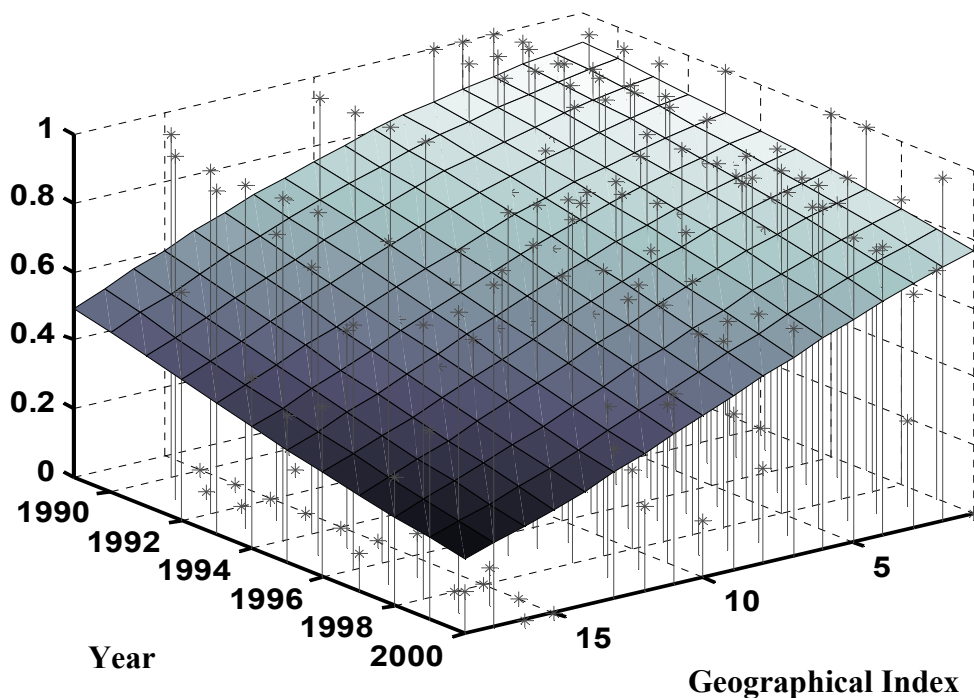


Figure 2. Response surface showing relationship between probability of presence in relation to year (1989-2000) and the geographical index (1 = northern-most, 21 = southern-most). See text for further discussion.

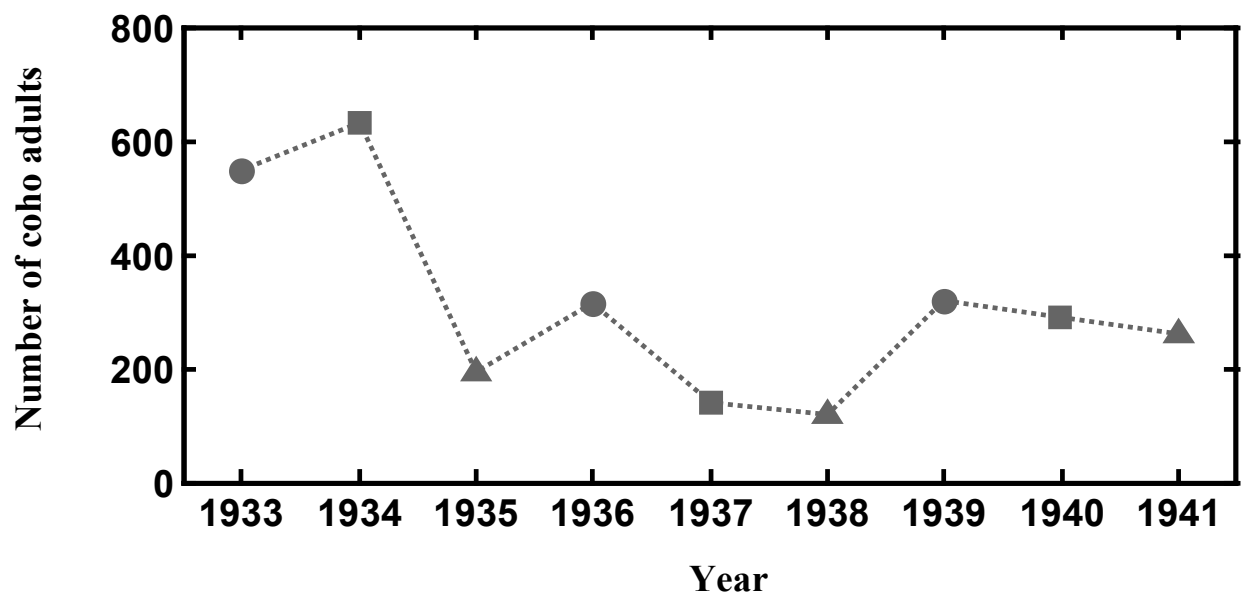


Figure 3. Estimated number of spawners in Waddell Creek, Santa Cruz County from 1933-1941. (Data source: Shapovalov and Taft 1954).

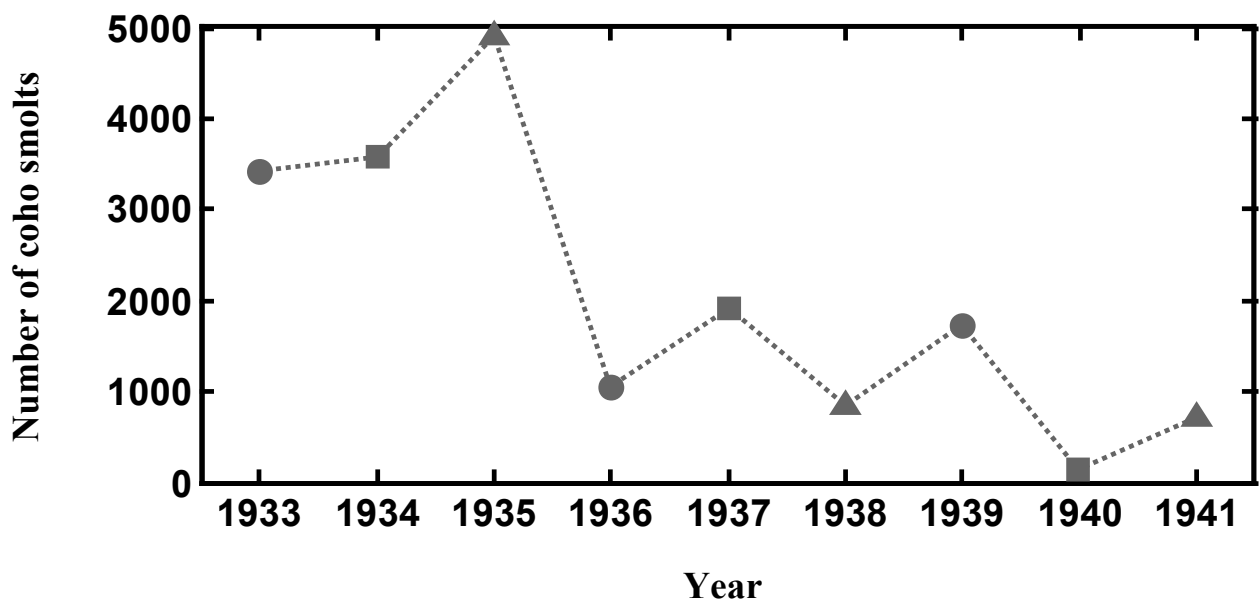


Figure 4. Counts of outmigrating smolts in Waddell Creek, Santa Cruz County from 1933-1941. (Data source: Shapovalov and Taft 1954).

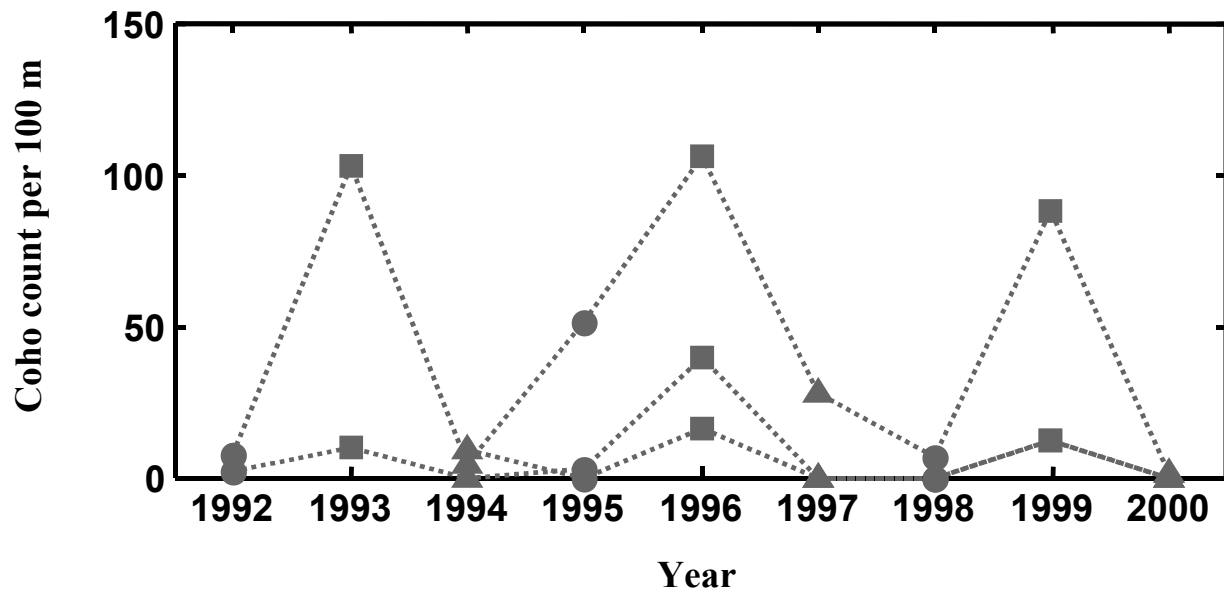


Figure 5. Summer juvenile coho salmon densities for index sites in Waddell and Scott creeks, Santa Cruz County, and Gazos Creek, San Mateo County, from 1992 to 2000. Symbols represent brood lineages. (Data source: Smith 2000a and previous reports.)

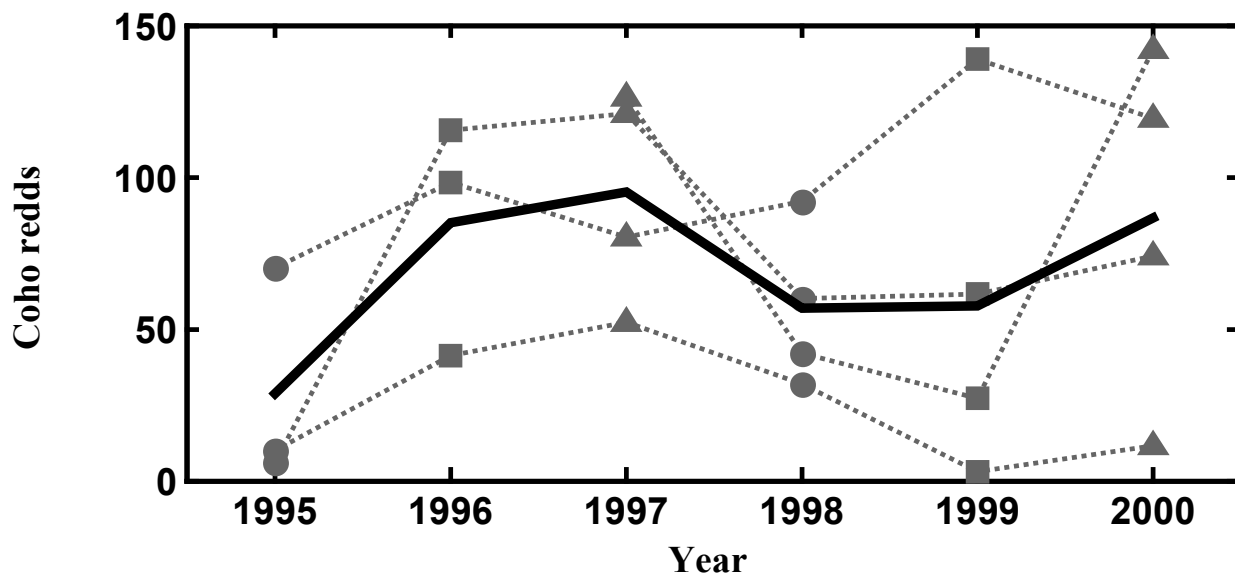


Figure 6. Redd counts Lagunitas Creek, and three tributaries, Marin County, from 1995 to 2000. Heavy line without symbols indicates means for all sites. Symbols represent brood lineages. (Data source: G. Andrew, Marin Municipal Water District, unpub. data)

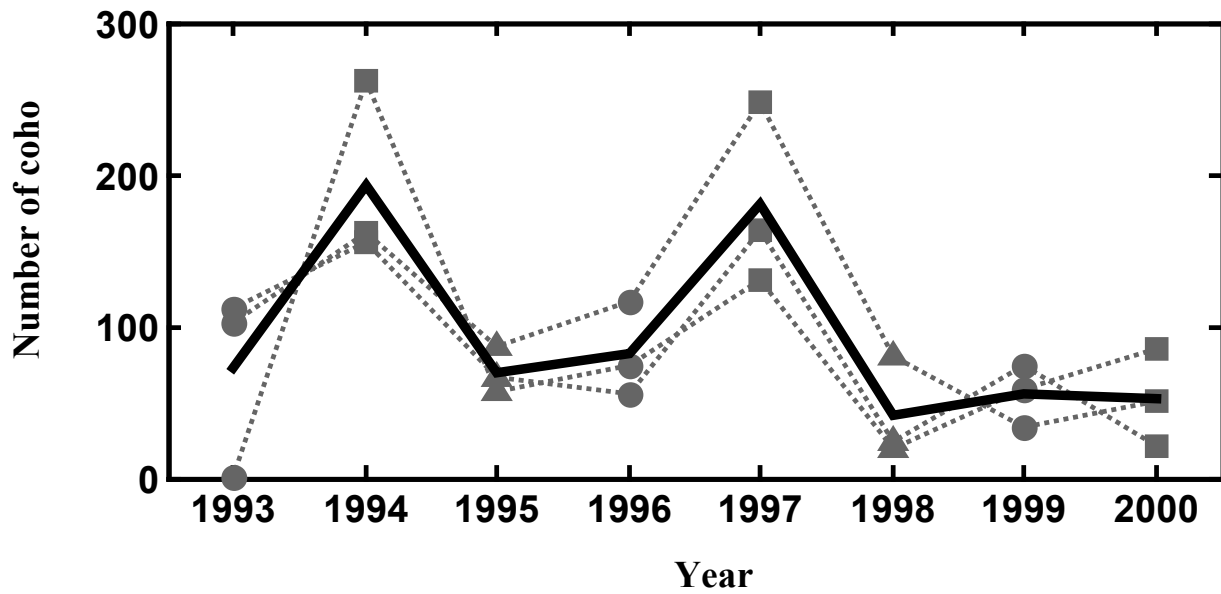


Figure 7. Summer juvenile coho salmon counts (total fish captured) for Lagunitas Creek and two tributaries, Devils Gulch, and San Geronimo Creek, Marin County, from 1993 to 2000. Heavy line without symbols indicates means for all sites. Symbols represent brood lineages. (Data source: Greg Andrew, Marin Municipal Water District, unpub. data)

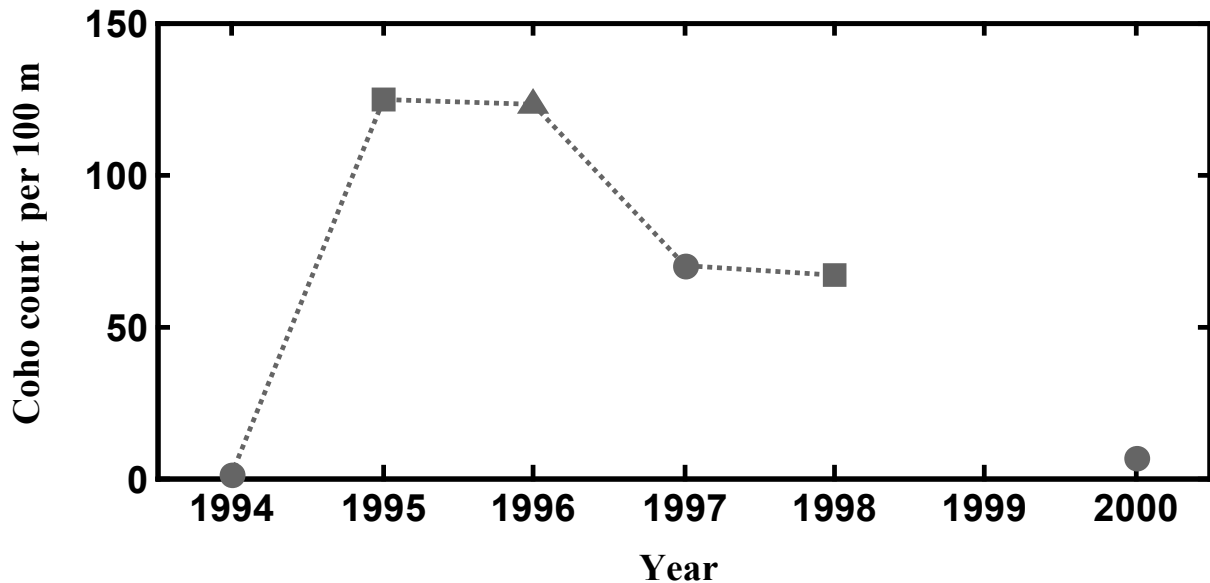


Figure 8. Summer juvenile coho salmon densities for index sites in Redwood Creek, Marin County, from 1992 to 2000. Symbols represent brood lineages. (Data source: Smith 2000a and previous reports.)

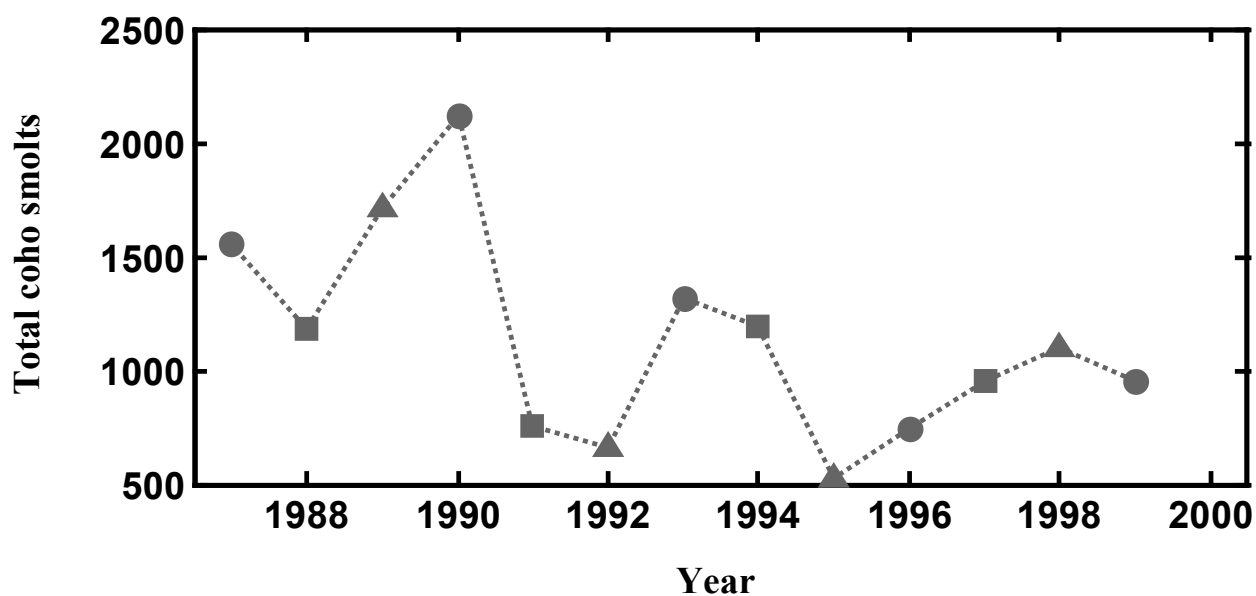


Figure 9. Coho salmon smolt counts in Caspar Creek, Mendocino County, from 1987 to 1999. Symbols represent brood lineages. (Data source: Scott Harris, CDFG, unpub. data)

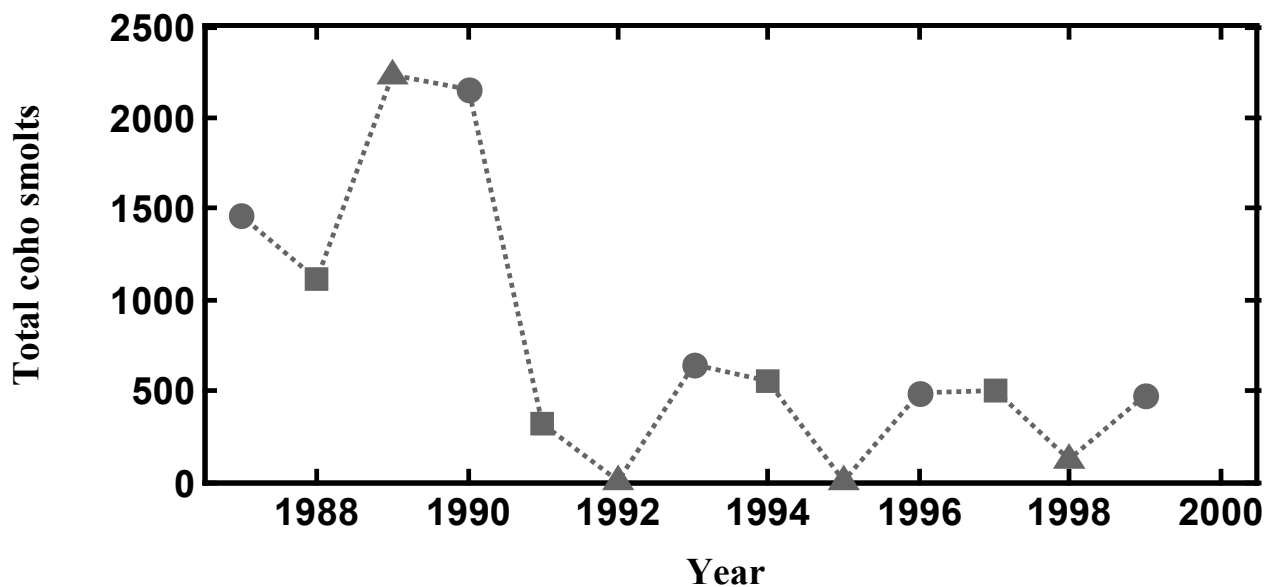


Figure 10. Coho salmon smolt counts in Little River, Mendocino County, from 1987 to 1999. Symbols represent brood lineages. (Data source: Scott Harris, CDFG, unpub. data)

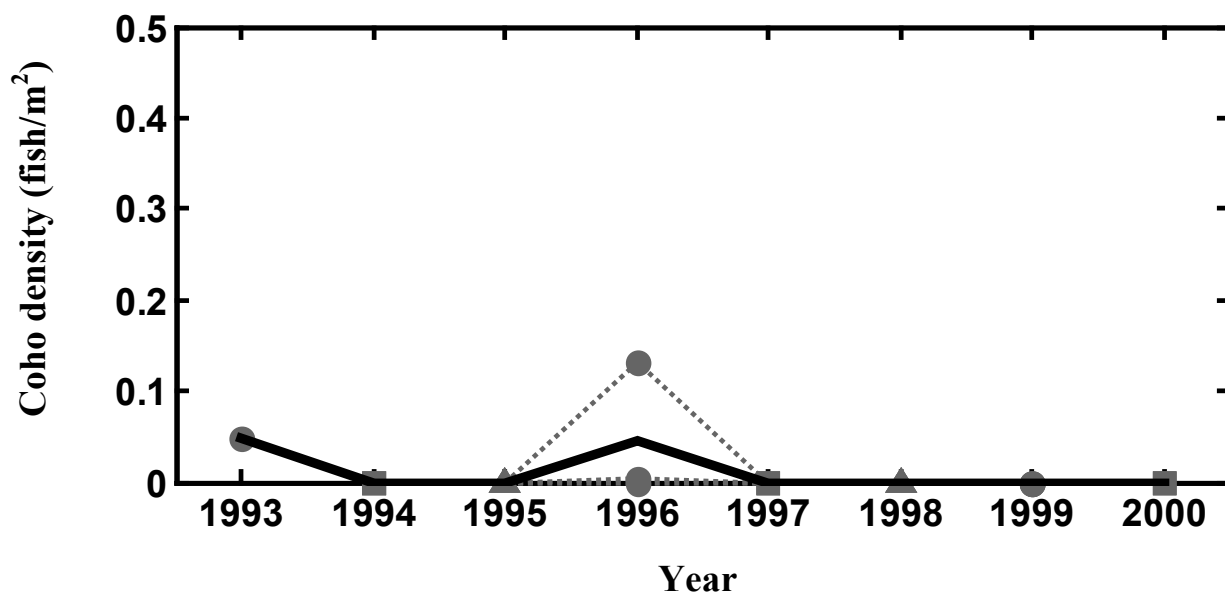


Figure 11. Summer juvenile coho salmon densities for three index sites in the Usal Creek basin, Mendocino County, from 1993 to 2000. Heavy line without symbols indicates means for all sites. Symbols represent brood lineages. (Data source: Campbell Timberland Management, unpub. data)

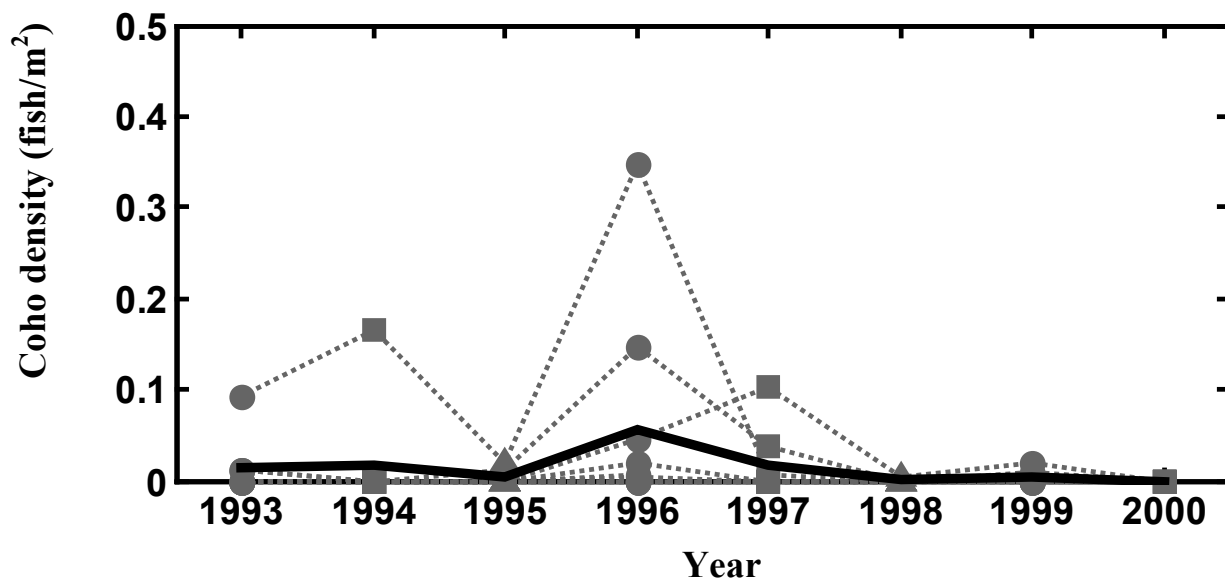


Figure 12. Summer juvenile coho salmon densities for eight index sites in the South Fork Ten Mile River basin, Mendocino County, from 1993 to 2000. Heavy line without symbols indicates means for all sites. Symbols represent brood lineages. (Data source: Campbell Timberland Management, unpub. data)

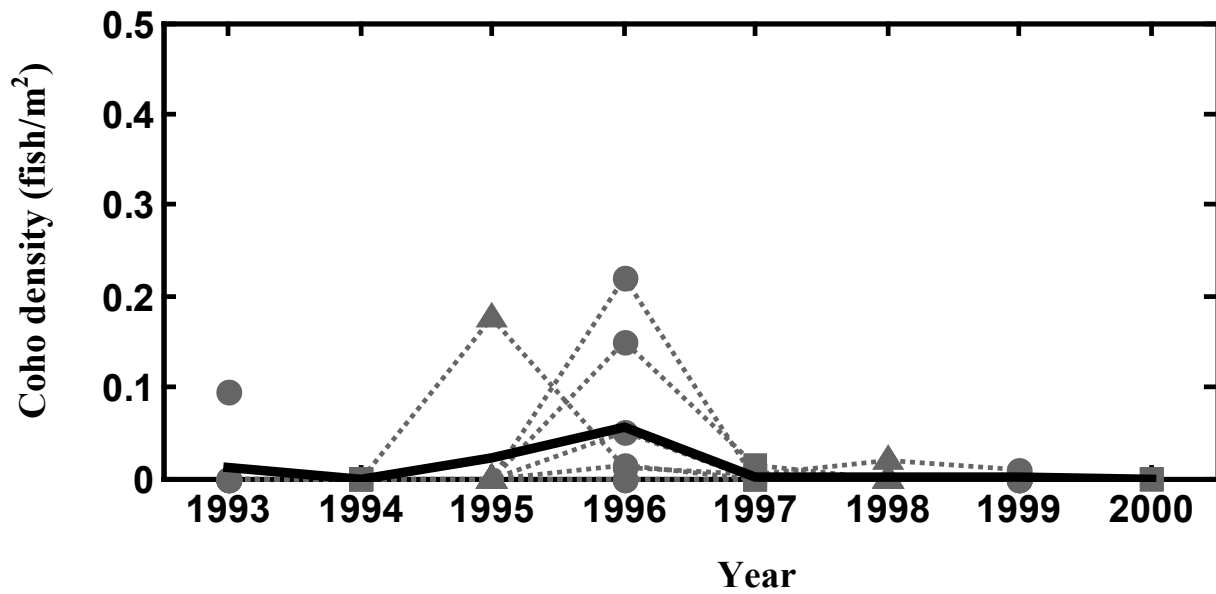


Figure 13. Summer juvenile coho salmon densities for six index sites in the North Fork Ten Mile River basin, Mendocino County, from 1993 to 2000. Heavy line without symbols indicates means for all sites. Symbols represent brood lineages. (Data source: Campbell Timberland Management, unpub. data)

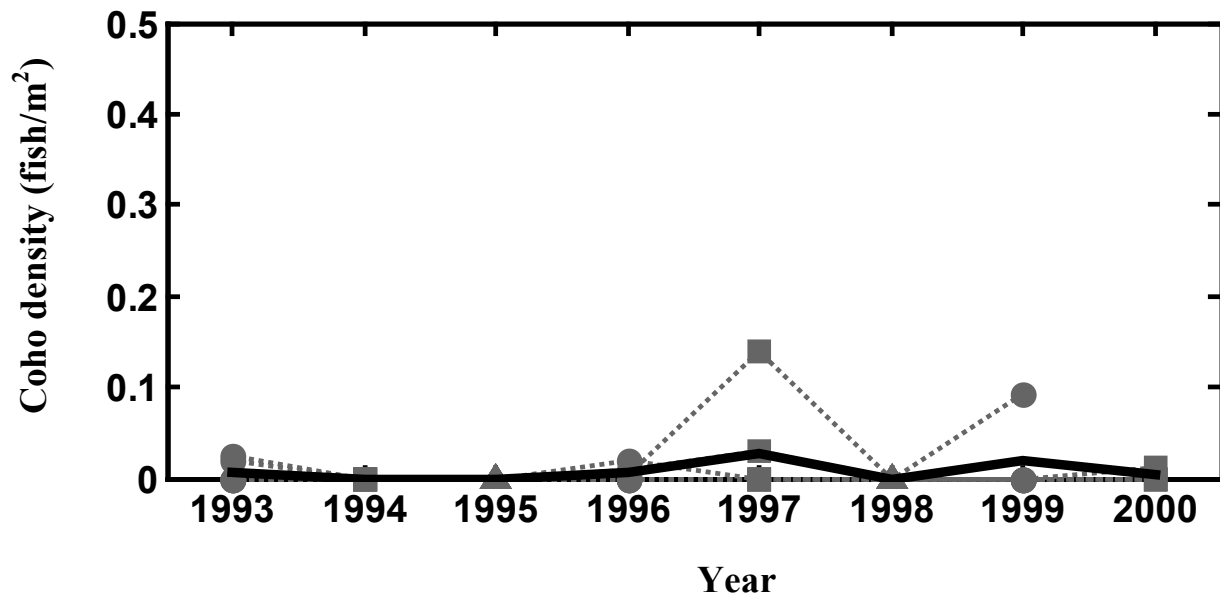


Figure 14. Summer juvenile coho salmon densities for three index sites in the Middle Fork Ten Mile River basin, Mendocino County, from 1993 to 2000. Heavy line without symbols indicates means for all sites. Symbols represent brood lineages. (Data source: Campbell Timberland Management, unpub. data)

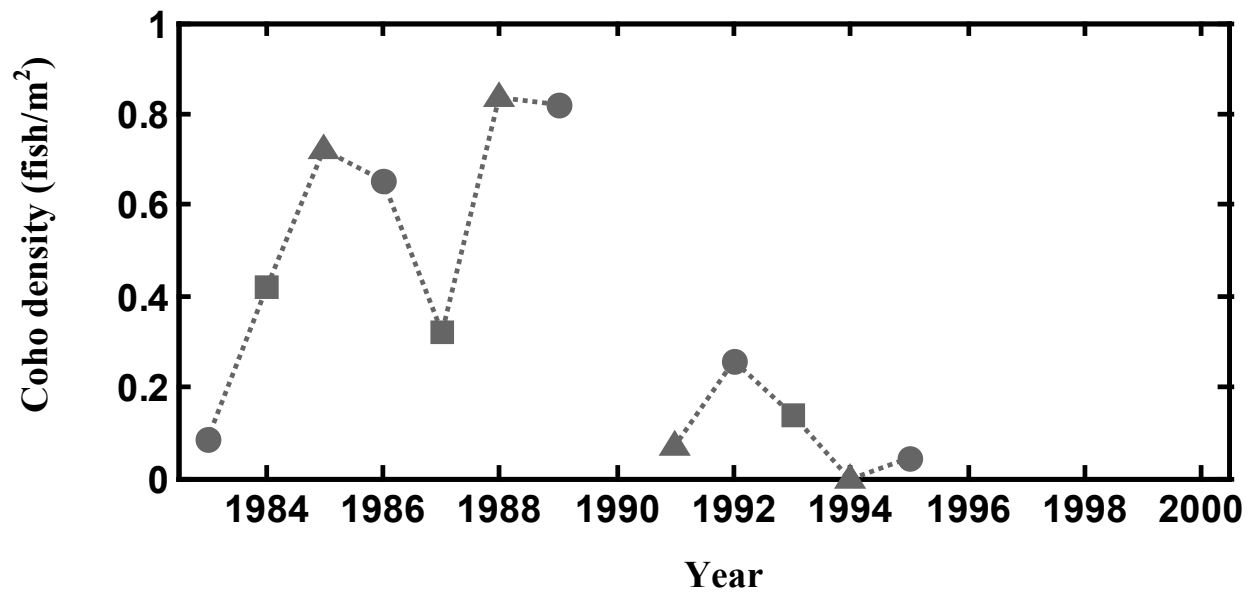


Figure 15. Summer juvenile coho salmon densities for an index site in Pudding Creek, Mendocino County, from 1983 to 1995. Symbols represent brood lineages. (Data source: Scott Harris, CDFG, unpub. data)

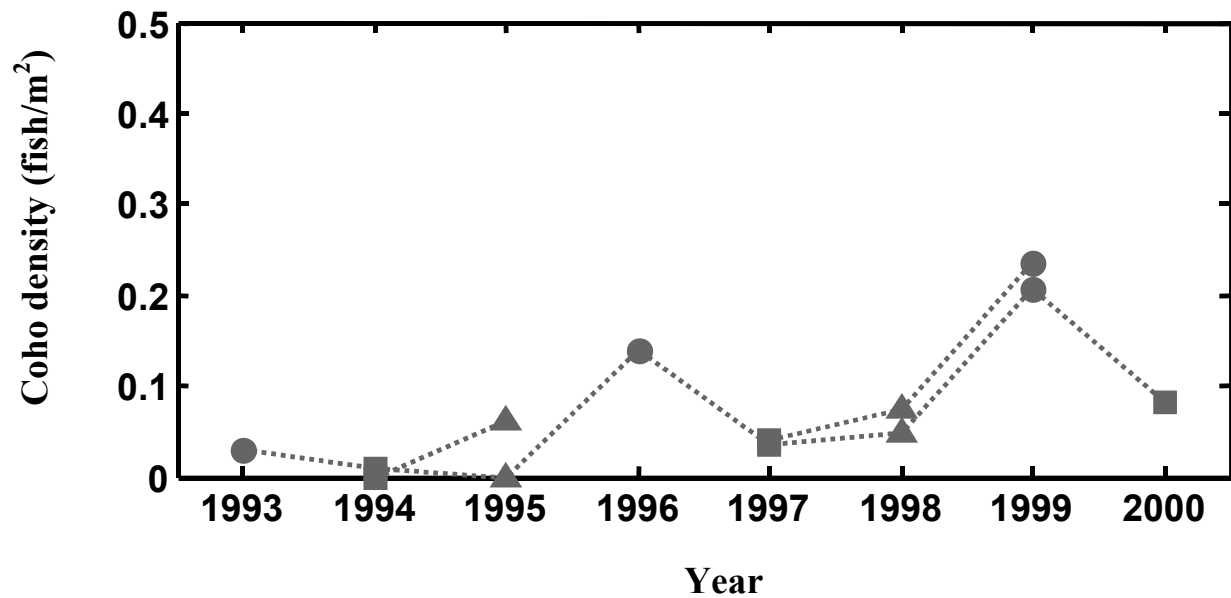


Figure 16. Summer juvenile coho salmon densities for two index sites in upper Pudding Creek, Mendocino County, from 1993 to 2000. Symbols represent brood lineages. (Data source: Campbell Timberland Management, unpub. data)

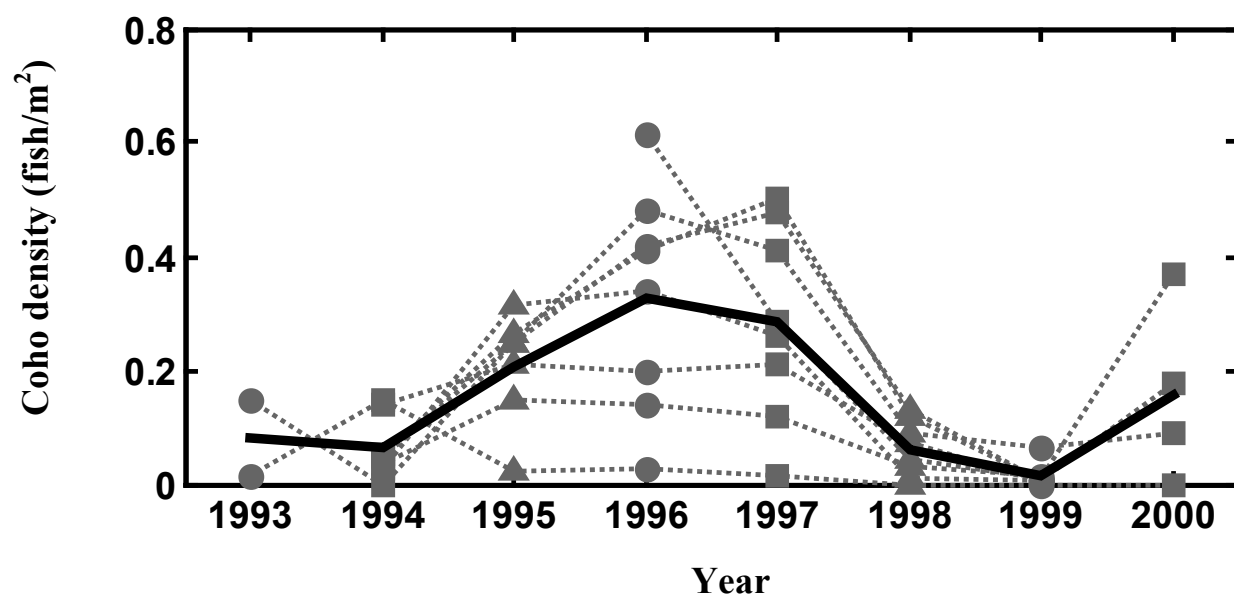


Figure 17. Summer juvenile coho salmon densities for eight index sites in the Noyo River basin, Mendocino County, from 1993 to 2000. Heavy line without symbols indicates means for all sites. Symbols represent brood lineages. (Data source: Campbell Timberland Management, unpub. data)

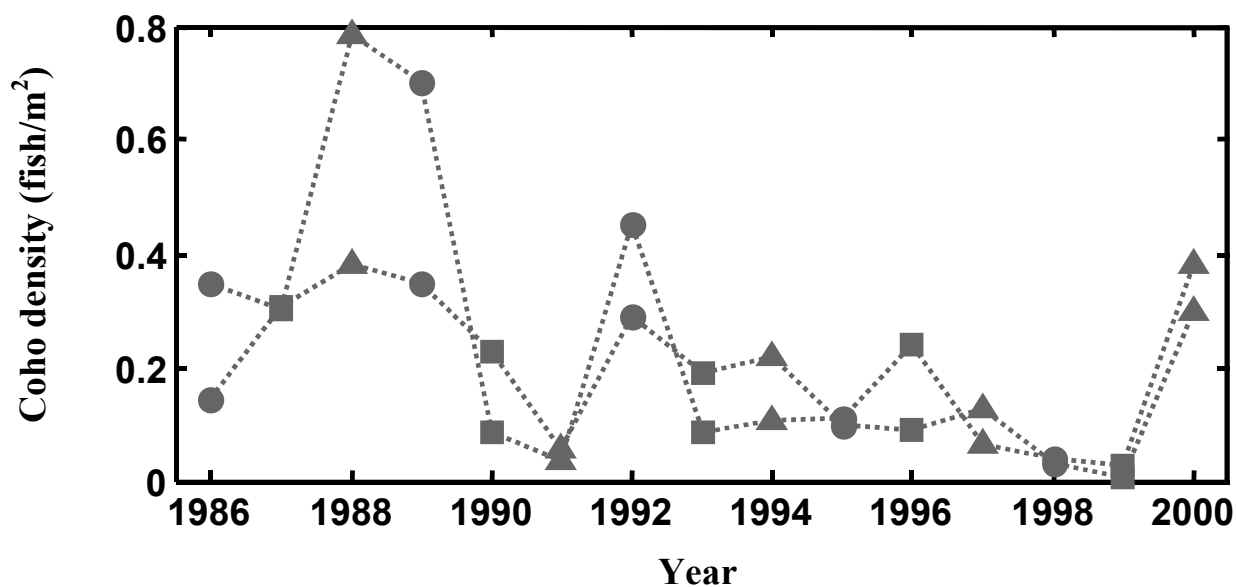


Figure 18. Summer juvenile coho salmon densities for two index sites in the Caspar Creek, Mendocino County, from 1986 to 2000. Symbols represent brood lineages. (Data source: Scott Harris, CDFG, unpub. data)

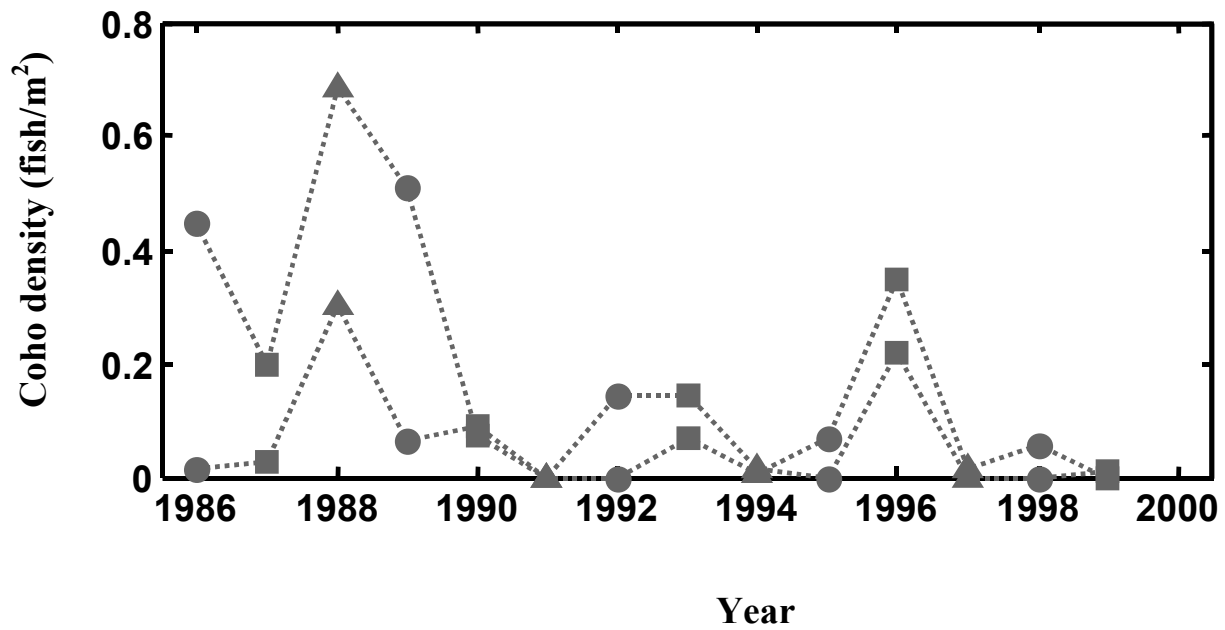


Figure 19. Summer juvenile coho salmon densities for two index sites in Little River, Mendocino County, from 1986 to 2000. Symbols represent brood lineages. (Data source: Scott Harris, CDFG, unpub. data)

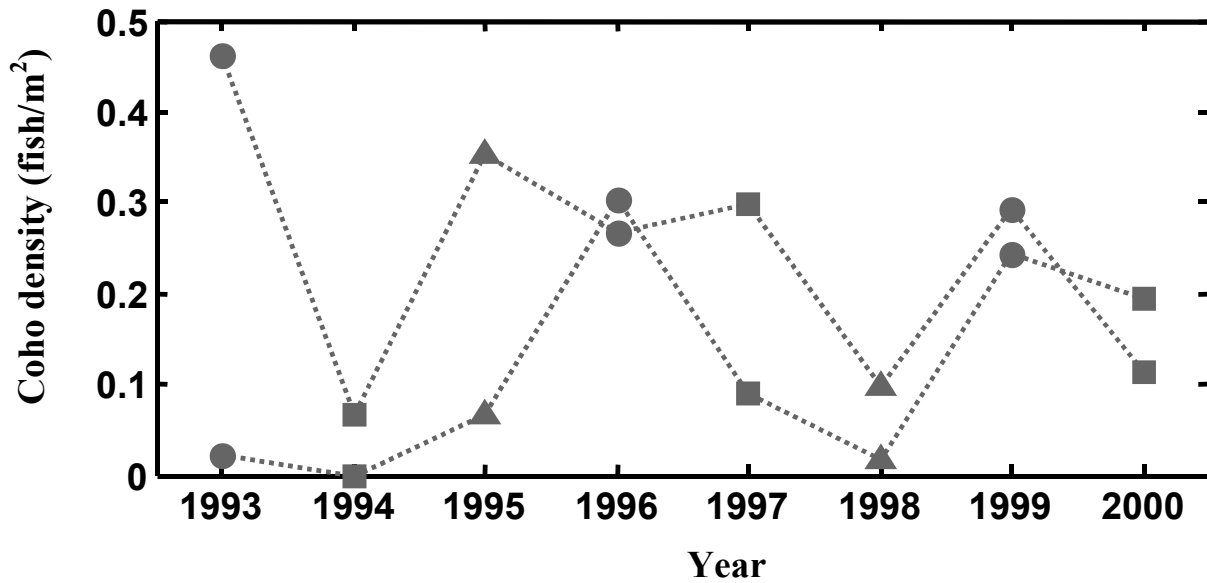


Figure 20. Summer juvenile coho salmon densities for two index sites in Big River, Mendocino County, from 1986 to 2000. Symbols represent brood lineages. (Data source: Campbell Timberland Management, unpub. data)

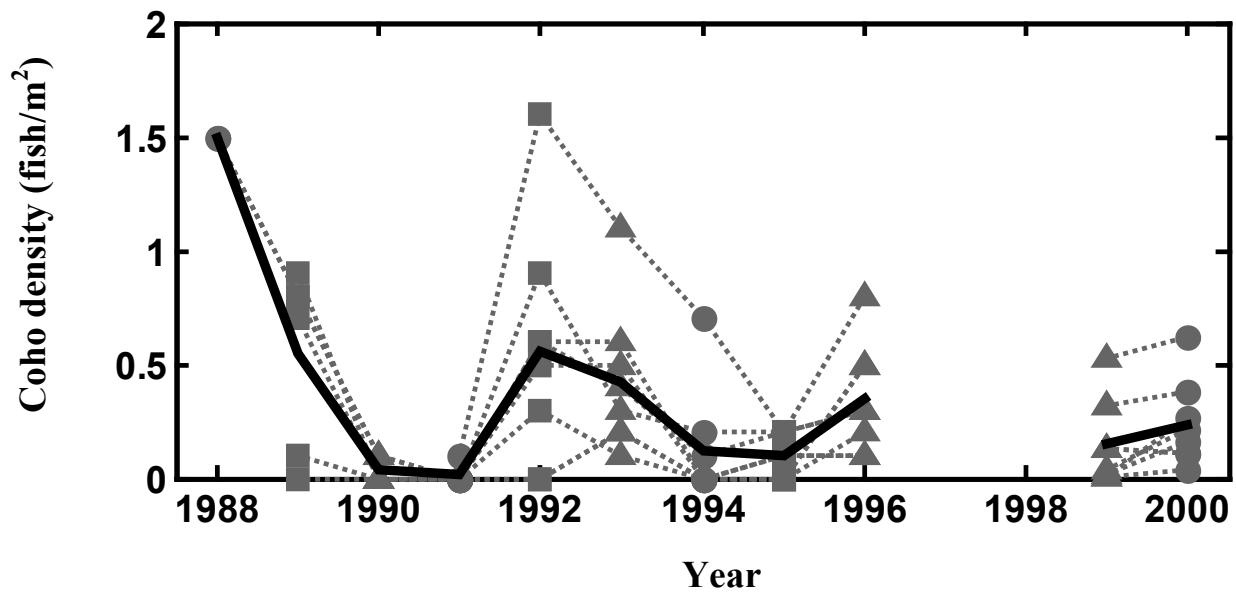


Figure 21. Summer juvenile coho salmon densities for seven index sites in Albion River and its tributaries, Mendocino County, from 1986 to 2000. Heavy line without symbols indicates means for all sites. Symbols represent brood lineages. (Data source: Mendocino Redwood Company, unpub. data)

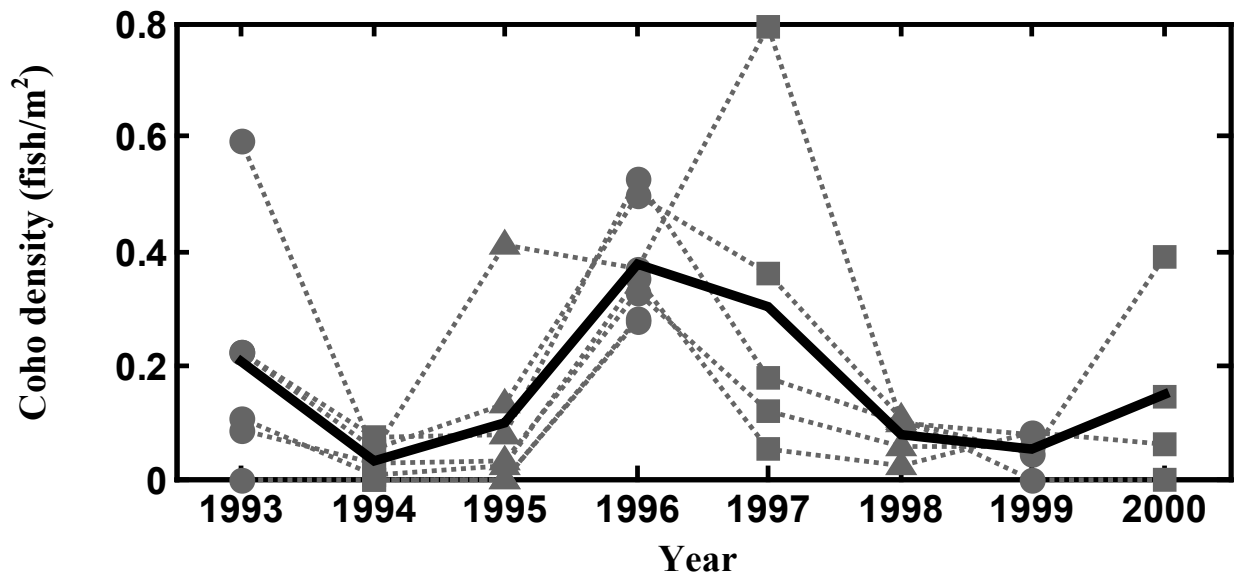


Figure 22. Summer juvenile coho salmon densities for six index sites in Big Salmon Creek and its tributaries, Mendocino County, from 1986 to 2000. Heavy line without symbols indicates means for all sites. Symbols represent brood lineages. (Data source: Campbell Timberland Management, unpub. data)

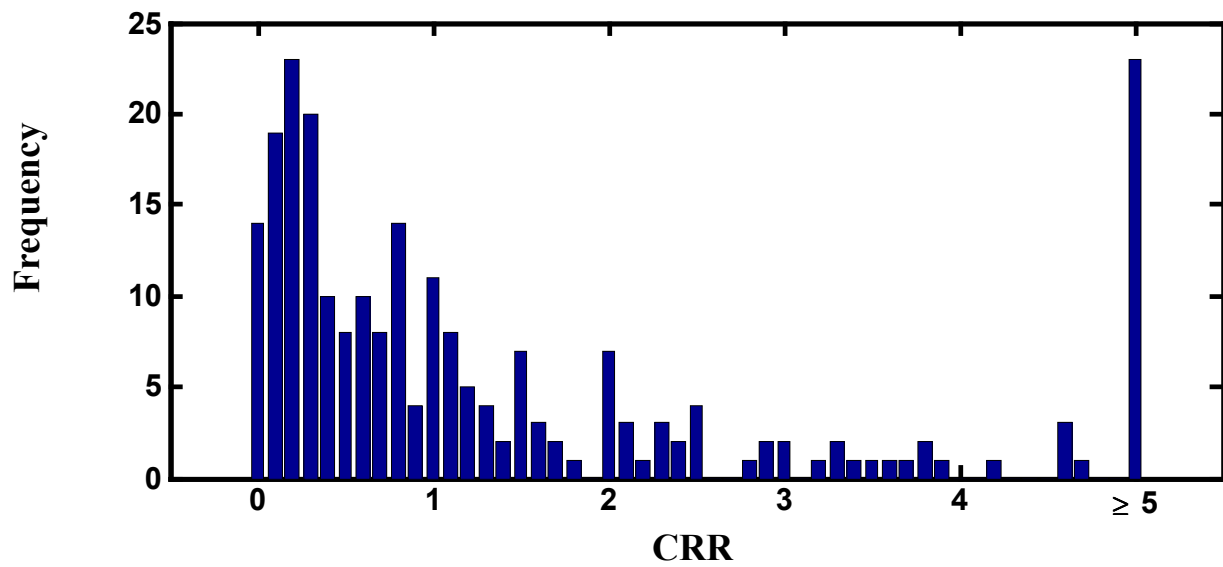


Figure 23. Frequency distribution of cohort replacement rates CRR for streams and rivers in the Central California Coast ESU indicating a significantly ($p = 0.0045$) higher likelihood of numbers decreasing with time. Values less than 1 indicate a decline in the abundance index from time t to time $t+3$.

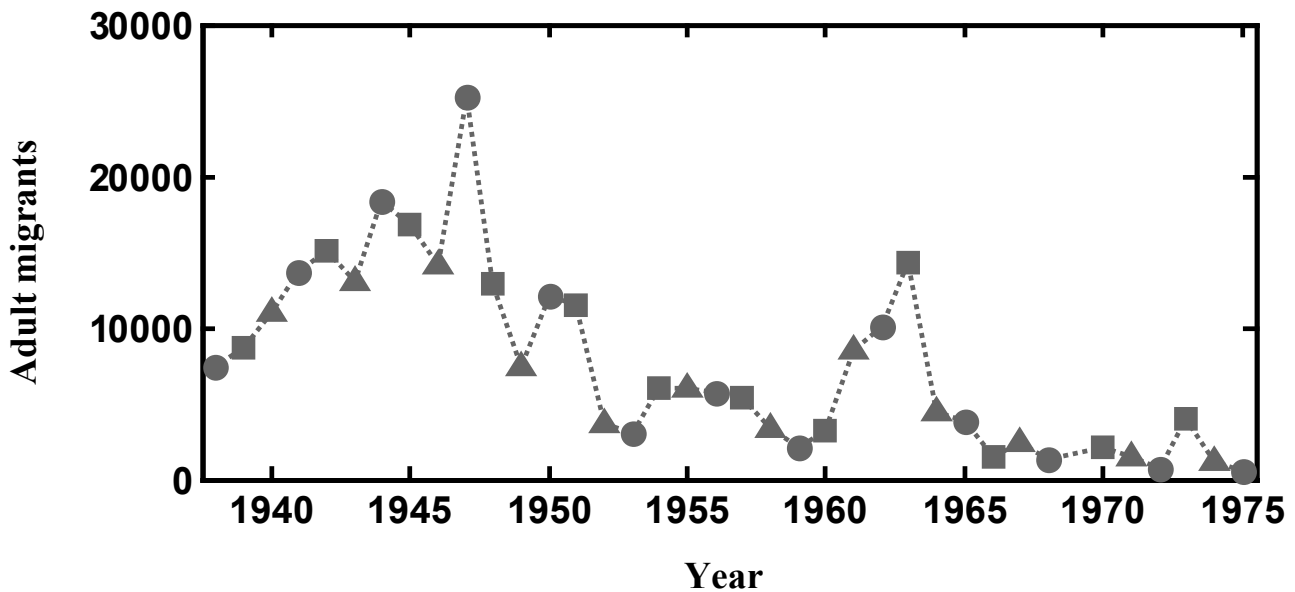


Figure 24. Adult coho counts at Benbow Dam, South Fork Eel River, from 1938 to 1975. (Data source: StreamNet 2001)

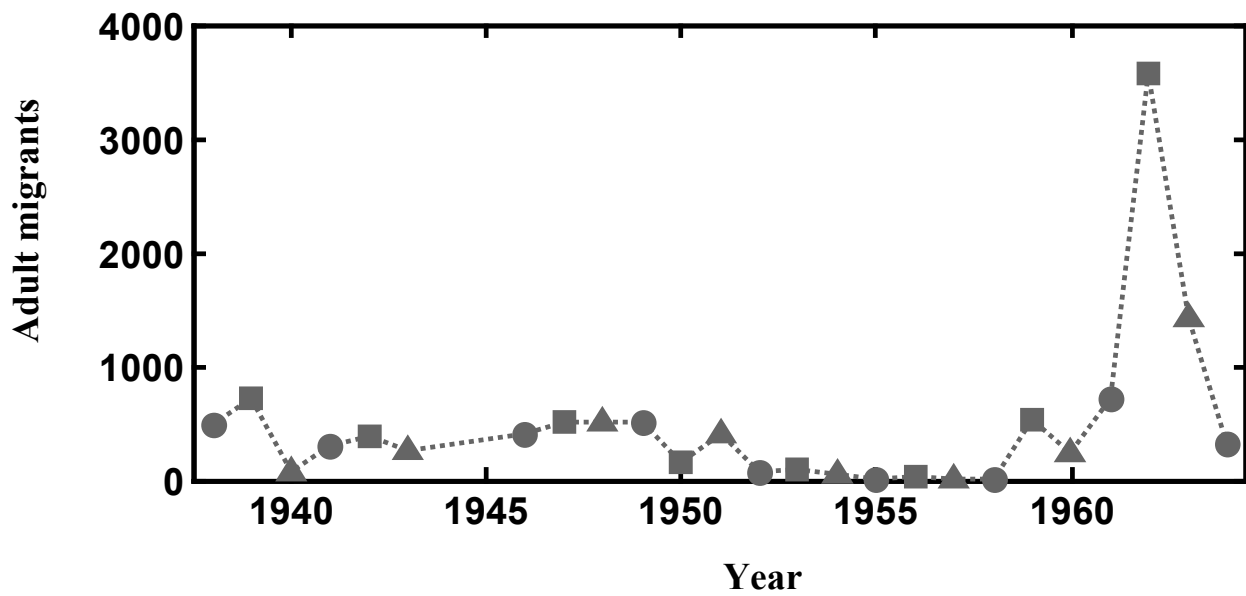


Figure 25. Adult coho counts at Sweasy Dam, Mad River, from 1938 to 1975. (Data source: StreamNet 2001)

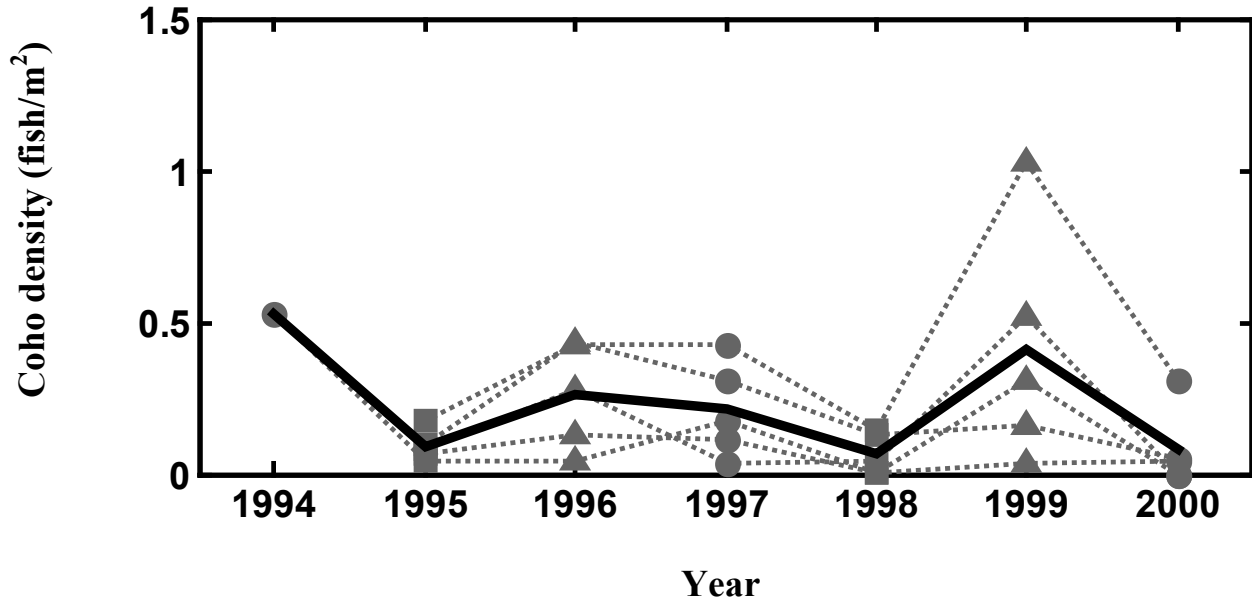


Figure 26. Summer juvenile coho salmon densities for five index sites in the South Fork Eel River and its tributaries, Mendocino and Humboldt counties, from 1986 to 2000. Heavy line without symbols indicates means for all sites. Symbols represent brood lineages. (Data source: Campbell Timberland Management, unpub. data)

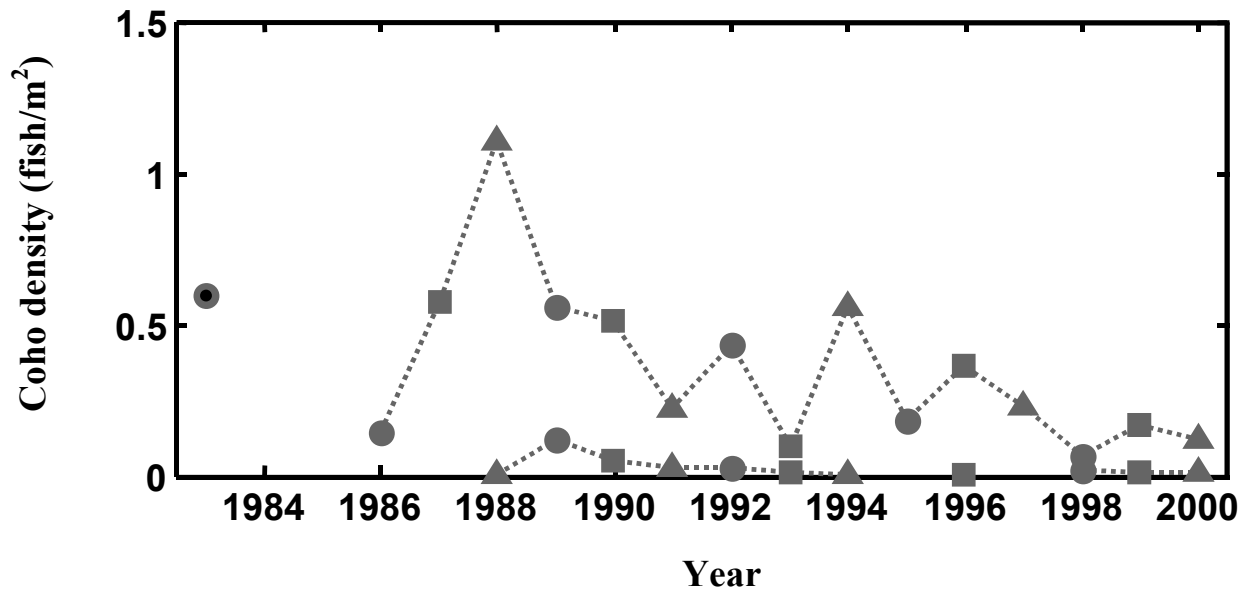


Figure 27. Summer juvenile coho salmon densities for two index sites Hollow Tree Creek, Mendocino County, from 1986 to 2000. Symbols represent brood lineages. (Data source: Scott Harris, CDFG, unpub. data)

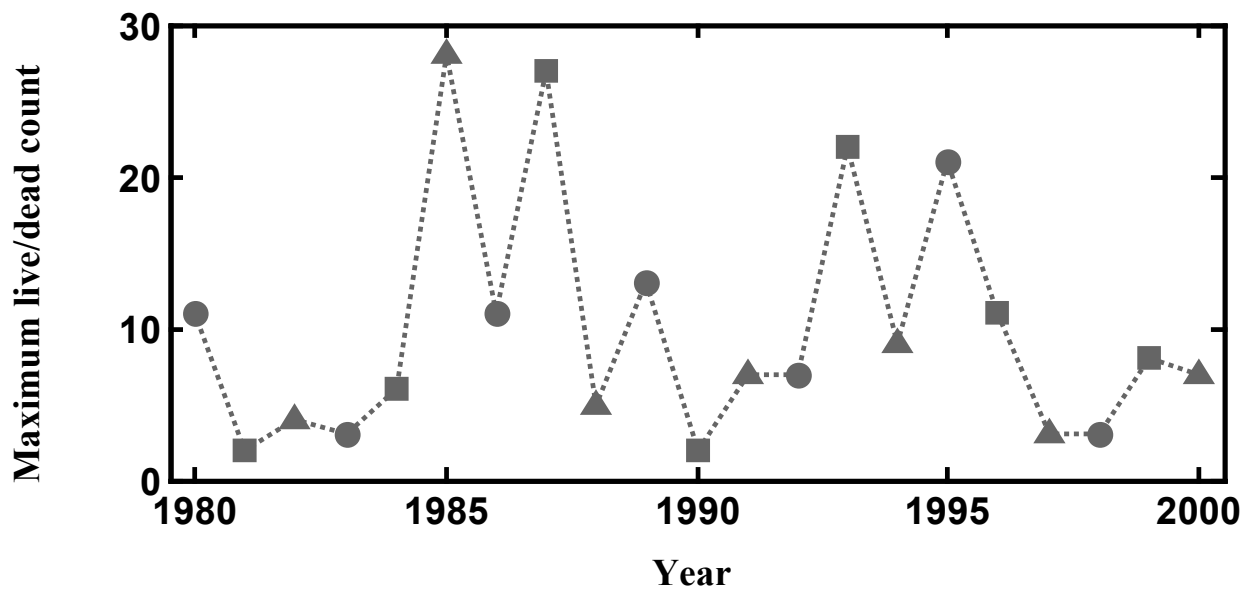


Figure 28. Maximum live/dead spawner counts for West Branch of Mill Creek, Del Norte County, from 1980 to 2000. Symbols represent brood lineages. (Data source: Waldvogel 1988; Jim Waldvogel, Cooperative Extension, unpub. data)

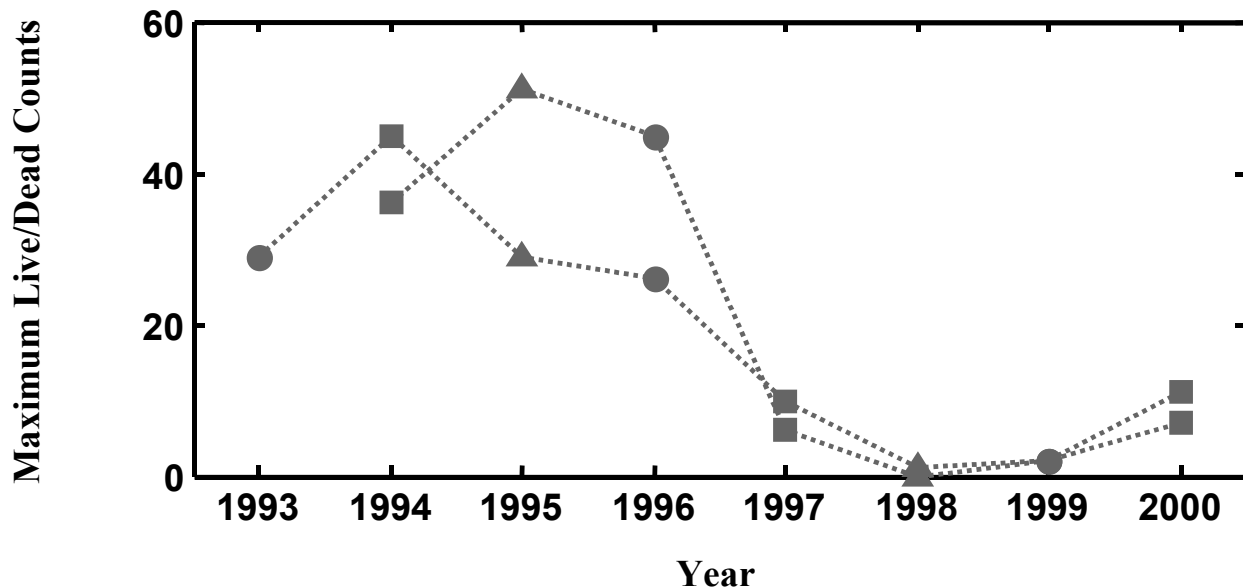


Figure 29. Maximum live/dead spawner counts for West Branch of Mill Creek, Del Norte County, from 1980 to 2000. Symbols represent brood lineages. (Data source: Paul Albro, Stimson Timber, unpub. data)

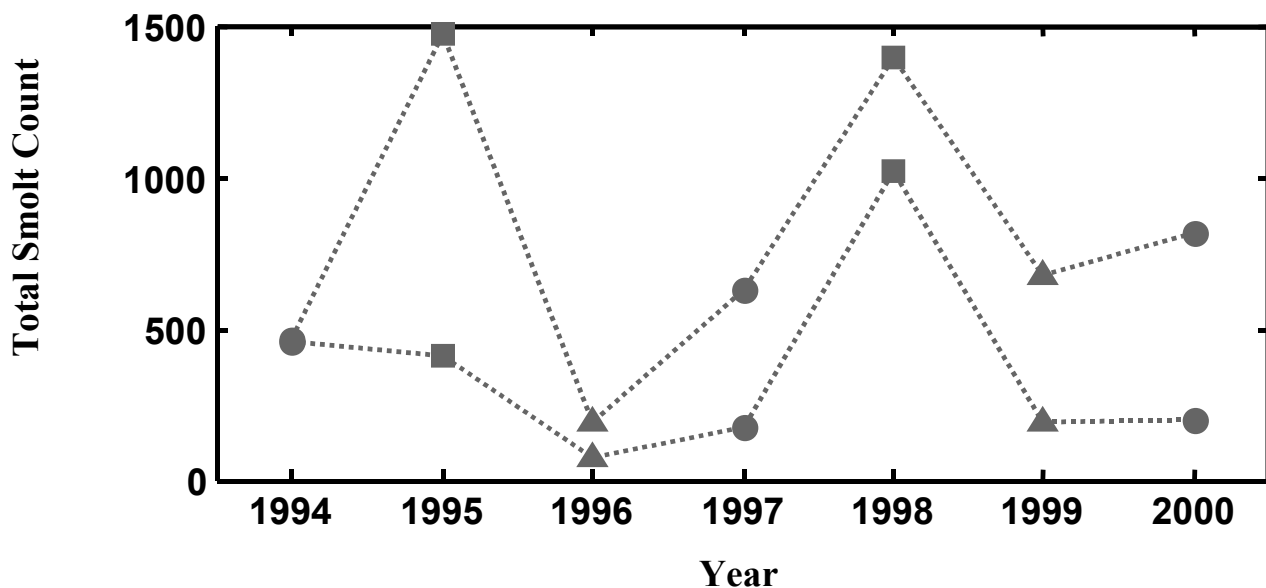


Figure 30. Total smolt counts from downstream migrant traps in West Branch and East Branch of Mill Creek, Del Norte County, from 1994 to 2000. Symbols represent brood lineages. (Data source: Stimson Lumber Company, 2000)

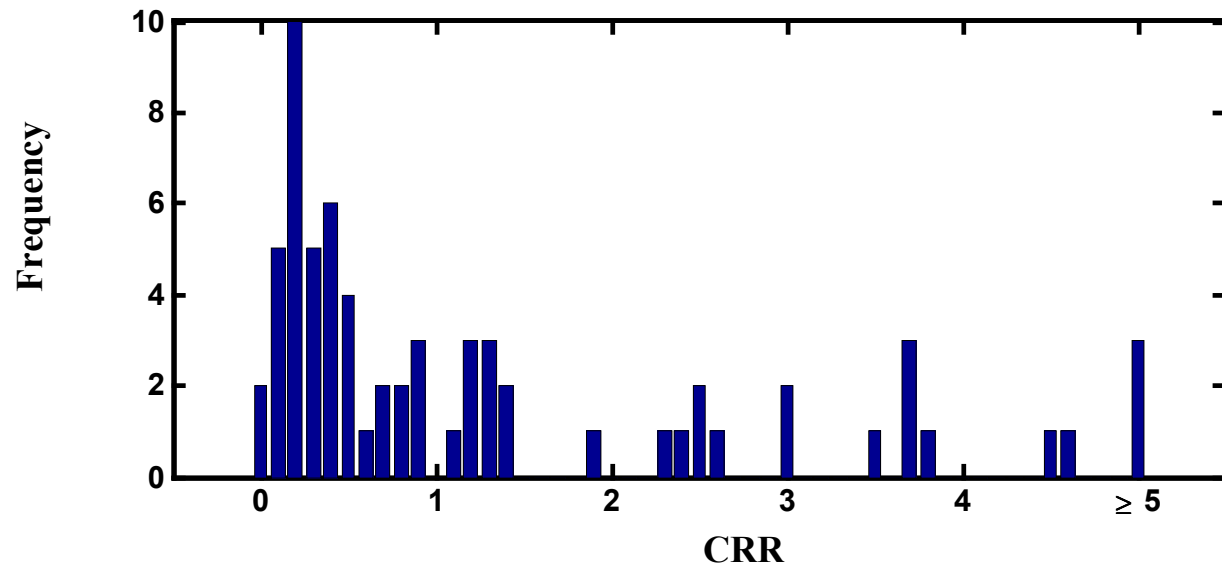


Figure 31. Frequency distribution of cohort replacement rates CRR for streams and rivers in the Southern Oregon/Northern California Coasts ESU indicating a significantly ($p = 0.0278$) higher likelihood of numbers decreasing with time. Values less than 1 indicate a decline in the abundance index from time t to time $t+3$.

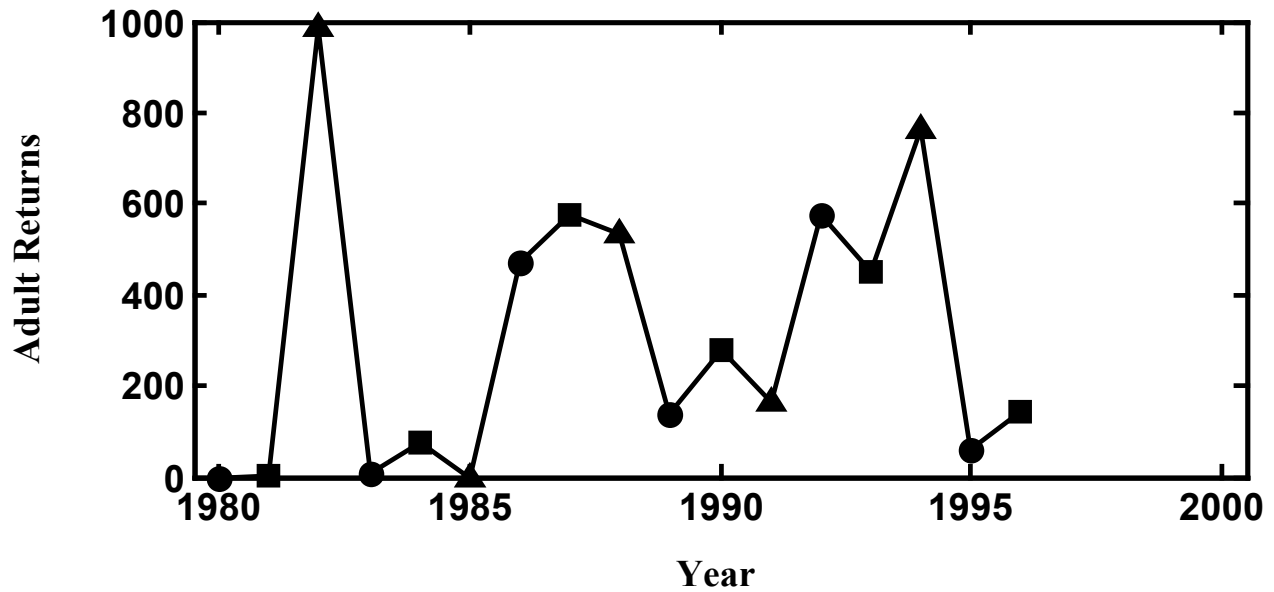


Figure 32. Adult coho salmon returns to Warm Springs Hatchery on Dry Creek (Russian River), Sonoma County, from 1980 to 1996.

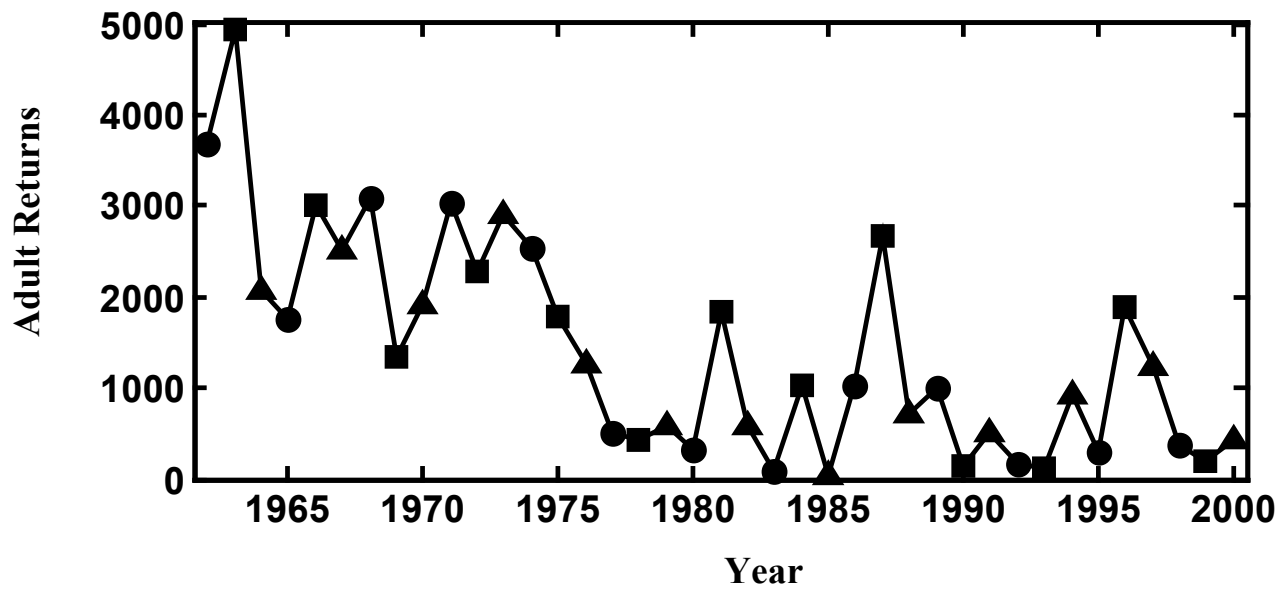


Figure 33. Adult coho salmon returns to Noyo Egg Collecting Station, Mendocino County, from 1965 to 2000.

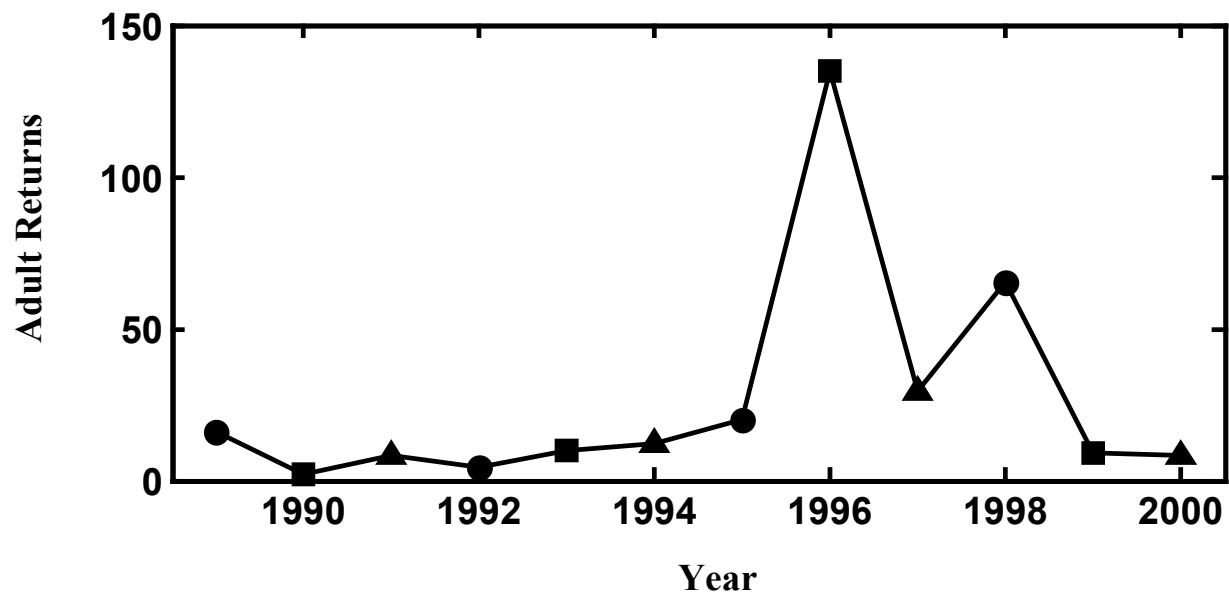


Figure 34. Adult coho salmon returns to Rowdy Creek Hatchery, De Norte County, from 1989 to 2000.

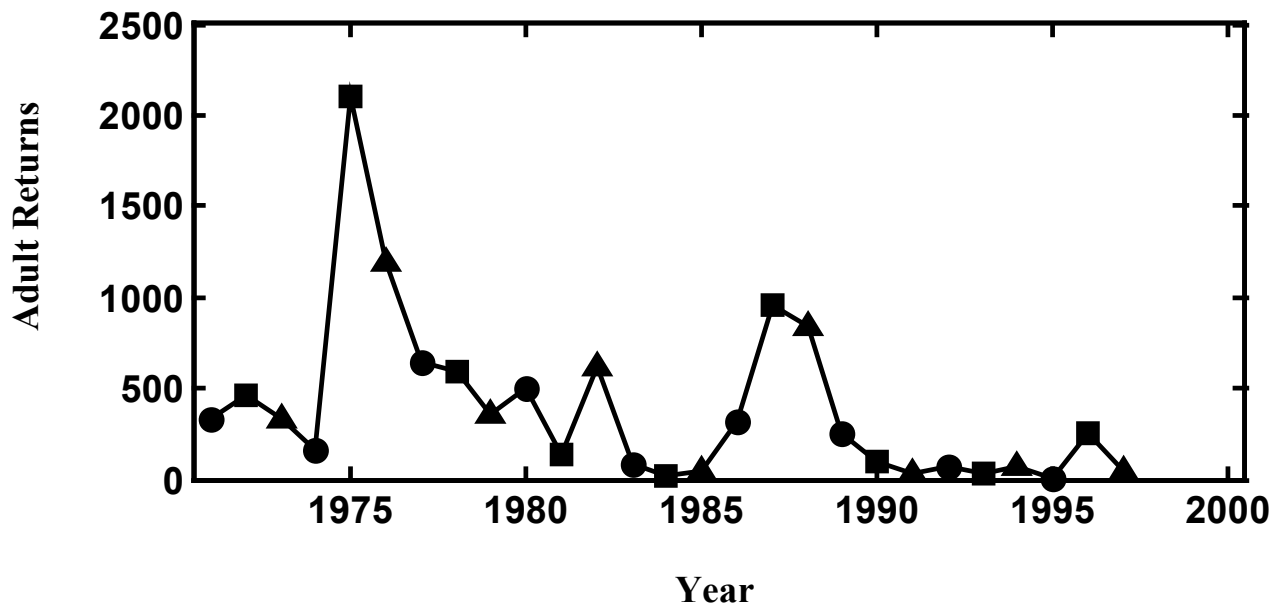


Figure 35. Adult coho salmon returns to Mad River Hatchery, Humboldt County, from 1971 to 1997.

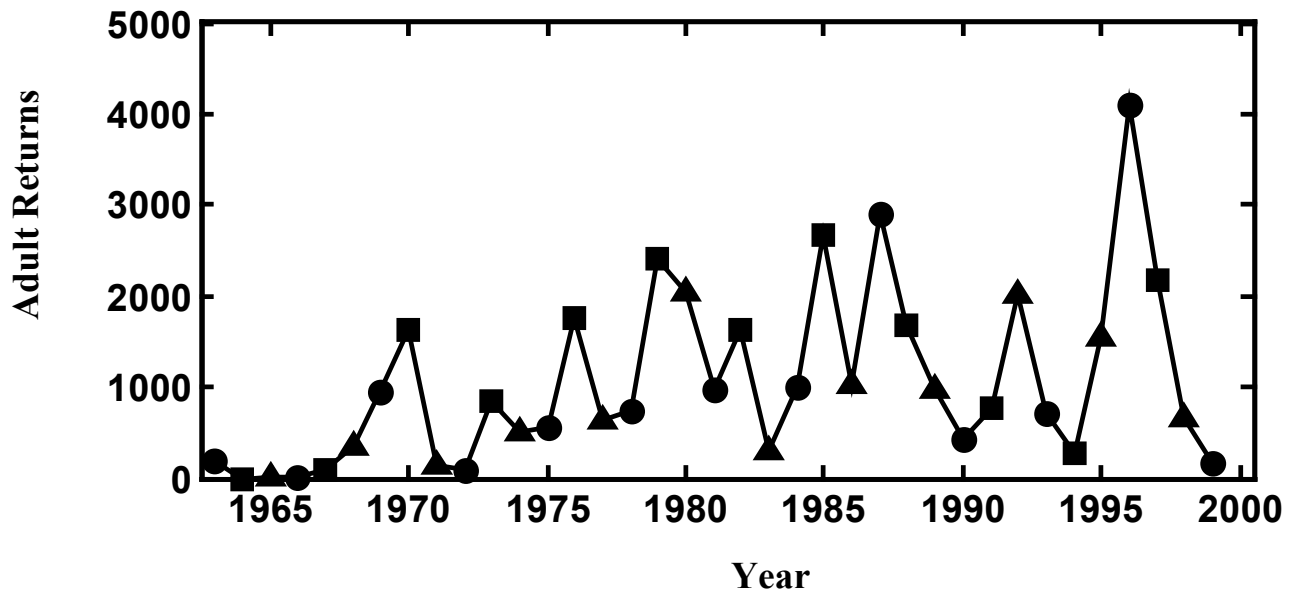


Figure 36. Adult coho salmon returns to Iron Gate Hatchery (Klamath River), Siskiyou County, from 1963 to 1999.

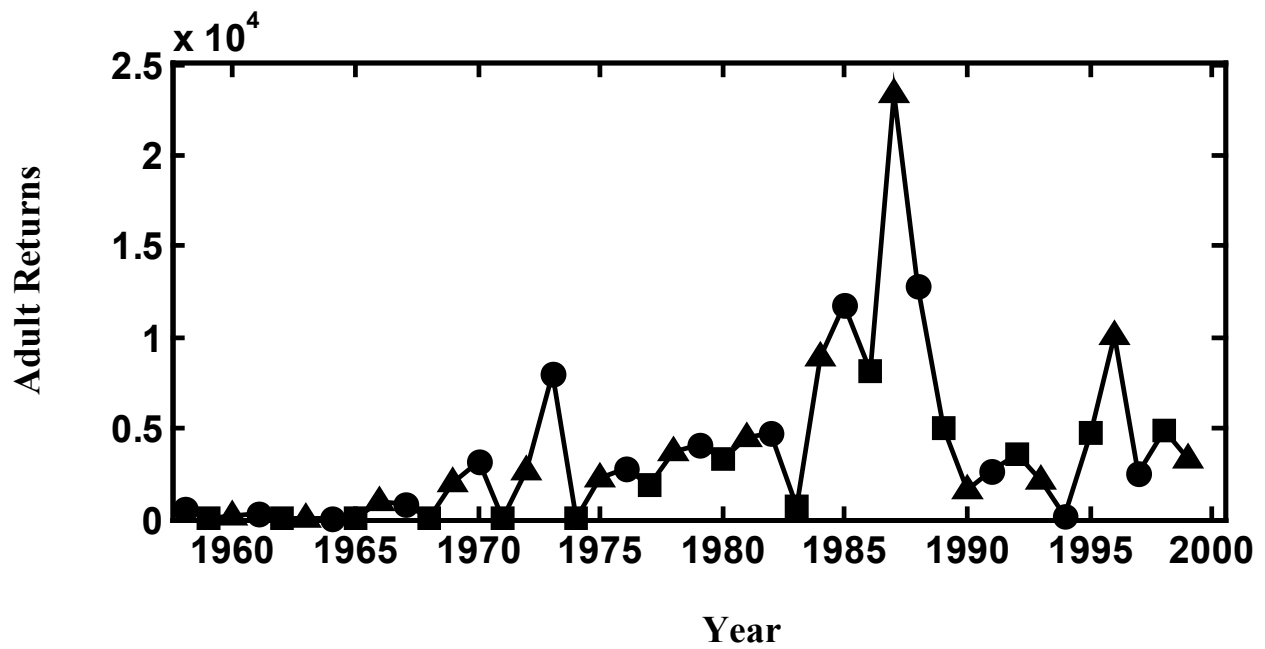


Figure 37. Adult coho salmon returns to Trinity Hatchery, Trinity County, from 1963 to 1999.

TABLES

Table 1. Geographical regions used to aggregate data for logistic regression analysis of presence-absence data. Regions are arranged north to south, as described in the text.

ESU/County	Watershed Group	Geographical Index
<i>Southern Oregon/Northern California ESU</i>		
Del Norte	Coastal	1
	Smith River	2
	Klamath River	3
Humboldt	Coastal	4
	Redwood Creek	5
	Mad River	6
	Eel River	7
	Mattole river	8
<i>Central California Coast ESU</i>		
Mendocino	Coastal	9
	Ten Mile River	10
	Noyo River	11
	Big River	12
	Navarro River	13
Sonoma	Coastal	14
	Gualala River	15
	Russian River	16
Marin	Coastal	17
San Francisco Bay	Coastal	18
San Mateo	Coastal	19
Santa Cruz	Coastal	20
Monterey	Coastal	21

Table 2. Percent of surveyed streams in the historic range of coho salmon with coho salmon present for four time intervals: 1989-1991, 1992-1994, 1995-1997, and 1998-2000. Results are summarized by ESU and county at the mouth of the stream or river system.

		1989-1991				1992-1994				1995-1997				1998-2000				
County	Number of Streams with Historical Presence	Number Surveyed ¹	Coho		No Data	Number Surveyed ¹	Coho		No Data	Number Surveyed ¹	Coho		No Data	Number Surveyed ¹	Coho		No Data	
			Present ²	Absent ³			Present ²	Absent ³			Present ²	Absent ³			Present ²	Absent ³		
Southern Oregon/Northern California Coasts ESU																		
Del Norte	Coastal	12	0	-	-	12	1	100%	0%	11	1	100%	0%	11	6	83%	17%	6
	Smith R.	52	5	80%	20%	47	16	69%	31%	36	35	63%	37%	17	14	43%	57%	38
	Klamath R.	189	62	95%	5%	127	105	90%	10%	84	61	70%	30%	128	72	69%	31%	117
Humboldt	Coastal	46	9	100%	0%	37	8	100%	0%	38	13	92%	8%	33	22	86%	14%	24
	Redwood Cr.	23	3	100%	0%	20	10	90%	10%	13	13	69%	31%	10	11	91%	9%	12
	Mad R.	23	2	100%	0%	21	1	100%	0%	22	4	100%	0%	19	4	100%	0%	19
	Eel R.	205	50	60%	40%	155	77	82%	18%	128	64	89%	11%	141	30	67%	33%	175
	Mattole R.	49	5	60%	40%	44	10	60%	40%	39	17	88%	12%	32	21	76%	24%	28
ESU Total		599	136	81%	19%	463	228	85%	15%	371	208	78%	22%	391	180	69%	27%	419
Central California Coast ESU																		
Mendocino	Coastal	74	15	53%	47%	59	37	51%	49%	37	47	60%	40%	27	47	47%	53%	27
	Ten Mile R.	18	10	20%	80%	8	13	31%	69%	5	14	71%	29%	4	13	54%	46%	5
	Noyo R.	25	3	67%	33%	22	11	82%	18%	14	17	82%	18%	8	18	56%	44%	7
	Big R.	23	1	0%	100%	22	14	21%	79%	9	16	81%	19%	7	13	23%	77%	10
	Navarro R.	28	1	0%	100%	27	15	27%	73%	13	17	65%	35%	11	16	44%	56%	12
Sonoma	Coastal	11	0	-	-	11	0	-	-	11	0	-	-	11	0	-	-	11
	Gualala R.	15	1	0%	100%	14	4	0%	100%	11	6	0%	100%	9	4	0%	100%	11
	Russian R.	46	1	100%	0%	45	9	78%	22%	37	20	45%	55%	26	14	7%	93%	32
Marin	Coastal	16	3	100%	0%	13	5	100%	0%	11	12	83%	17%	4	10	80%	20%	6
San Francisco Bay	Coastal	6	0	-	-	6	0	-	-	6	1	0%	100%	5	0	-	-	6
San Mateo	Coastal	5	0	-	-	5	1	100%	0%	4	5	20%	80%	0	3	67%	33%	2
Santa Cruz	Coastal	9	0	-	-	9	3	67%	33%	6	5	60%	40%	4	6	50%	50%	3
Monterey	Coastal	2	0	-	-	2	0	-	-	2	2	0%	100%	0	0	-	-	2
ESU Total		278	35	46%	54%	243	112	48%	52%	166	162	61%	39%	116	144	44%	56%	134

¹ Total number of streams surveyed at least once within the three-year interval

² Percentage of surveyed streams where coho were present in one or more years during the interval

³ Percentage of surveyed streams where coho were absent in all years of survey during the interval

APPENDICES

APPENDIX A

Description

Table A-1 lists all streams within the Central California Coast and Southern Oregon/Northern California Coasts coho salmon ESUs for which we found some historical (pre-1989) or current (1989-2000) record of coho salmon occurrence.

The list is arranged geographically according to the following conventions. River basins are listed from north to south according to where the eventual outlet stream or river enters the Pacific Ocean. Within a basin, tributary streams and rivers are listed in the order that they enter the mainstem as one moves upstream from the river mouth. An identical hierarchy is employed for tributaries, with streams listed in order from mouth to headwaters. Where a river splits into two or more major forks of comparable area, we listed the north or west fork first followed by the south or east fork. Where two forks drain areas of unequal size, the smaller drainage is treated as the tributary.

Stream names were derived from 7.5 minute United States Geologic Survey (USGS) topographic maps where possible. Frequently, we found data records in which streams were referred to by alternate names or spellings. These alternative spellings are listed in parentheses next to the name found on USGS maps. We also found records of coho salmon occurring in streams that we could not locate on USGS maps. In most cases, these names are likely local names given to unnamed tributaries. In these instances, a parenthetical (location?) is placed after the name, indicating that we believe the stream lies near to where it is placed in the table but that the precise location could not be determined from the information available to us.

Township (T), range (R), section (S), quarter section ($\frac{1}{4}$), and quarter of quarter sections ($\frac{1}{4}$ of $\frac{1}{4}$) are given where such information was readily available from the sources we used. Some errors were found in published TRS descriptions and these were changed; however, we did not check the accuracy of all geographic coordinates.

The historical sources listed represent both original documents and sources cited in various reviews including Brown and Moyle (1991), Hassler et al. (1991), Adams et al. (1999), and Kier Associates (1999). The bibliography at the end of the appendices denotes whether we have examined the original source or whether we rely on the work of these other authors in documenting historical coho occurrence. If the cell for historical sources is blank, it means that the first record of presence we found was between the years 1989 and 2000, inclusive. It should be noted that we found several inconsistencies in records among authors, often due to the fact that certain common stream names are found multiple times within a watershed. We attempted to resolve these discrepancies as much as possible, but there are still likely a few omissions or duplications within the stream list.

Finally, these appendices will be continuously updated as new information becomes available. We encourage readers of this report who discover errors or omissions in this list to contact Dr. Brian Spence at the following address:

National Marine Fisheries Service
Southwest Fisheries Science Center
110 Shaffer Road
Santa Cruz, CA 95060
Brian.Spence@noaa.gov

Table A-1. List of streams for which historical (pre-1989) or current (1989-2000) records exist documenting the occurrence of coho salmon.

Stream	Location					Historical sources	Brown and Moyle 1991	Hassler et al. 1991	Adams et al. 1999	Kier Associates 1999
	T	R	S	¼ of ¼	¼					
<u>SOUTHERN OREGON/NORTHERN CALIFORNIA ESU</u>										
Del Norte County										
Illinois River										
West Fork Illinois River										
Elk Creek	19N	4E	35		NW	12	x	x		x
Broken Kettle Creek	18N	4E	2		NW	12	x	x		x
South Fork Broken Kettle Creek										
East Fork Illinois River								x		
Dunn Creek	19N	5E	34		NW	12,180	x	x		x
North Fork Dunn Creek										
South Fork Winchuck River	19N	1W	33	NW	NW	12,38,216	x	x		x
Smith River	18N	1W	17	SW	SE	6,11,12,179,308	x	x		x
Rowdy Creek	18N	1W	34	SE	NW	143,317	x	x		x
Dominie Creek	18N	1W	26	NW	NE	12	x	x		x
South Fork Rowdy Creek (Low Divide Road)	18N	1E	30	SE	NW					x
Savoy Creek	18N	1E	30	SW	SE	12	x	x		x
Copper Creek	18N	1E	16	NE	NE	12	x	x		x
Morrison Creek	18N	1W	34	SE	SE	30,143	x	x		x
Little Mill Creek (=Jaqua or Iaqua)	17N	1W	12	SW	SE	92	x			x
Sultan Creek	17N	1W	13	SE	SE					x
Peacock Creek	17N	1E	30	SW	SW					x
Clarks Creek	17N	1E	31	SW	SE					x
Mill Creek	16N	1E	8	SW	SE	12,22,30,92,317	x	x		x
West Branch Mill Creek (=West Fork)	16N	1E	32	SW	NW	12,22,92	x	x		x
East Branch Mill Creek (=East Fork)	16N	1E	32	SW	NW	22,92	x	x		x
Kelly Creek										x
Bummer Lake Creek	15N	1E	4	NW	NE	22	x	x		x
Low Divide Creek										x
South Fork Smith River	16N	1E	10	SW	NW	12	x	x		x
Craigs Creek	16N	1E	11	SE	SE	12	x	x		x
Coon Creek	16N	2E	19	SE	NW	12	x	x		x
Rock Creek	16N	2E	32		SW					x
Hurdygurdy Creek (=Hurdy Gurdy)	15N	2E	23	SW	NE	12,180,249	x	x		x
Jones Creek	15N	2E	24	SW	NE	12	x	x		x
Muzzleloader Creek (=Muzzle Loader)	15N	3E	8		NW	12	x	x		x
Buck Creek	15N	3E	33		NW	12	x	x		x

Stream	Location					Historical sources	Brown and Moyle 1991	Hassler et al. 1991	Adams et al. 1999	Kier Associates 1999
	T	R	S	¼ of ¼	¼					
Quartz Creek	15N	3E	33		NE	12	x	x		x
Eightmile Creek (=Eight Mile)	15N	3E	34		SE	12,241	x	x		x
Williams Creek	14N	3E	12		NW	12	x	x		x
Prescott Fork Smith River	15N	4E	18		NE	12	x	x		x
Middle Fork Smith River	17N	2E	20	NW	SE	12	x	x		x
Myrtle Creek	16N	1E	10	NE	NW	12	x	x		x
Hardscrabble Creek	17N	1E	25		SE	12	x	x		x
North Fork Smith River	17N	2E	20	NW	SE	12	x	x		x
Stoney Creek (=Stony)	17N	2E	17		SW	240				x
Peridotite Canyon (=Peridotite Creek)	17N	2E	6		NE	12	x	x		x
Still Creek	18N	2E	18		SW	12	x	x		x
Diamond Creek	18N	2E	9		SW	12	x	x		x
Bear Creek	18N	2E	10		SE	244				x
North Fork Diamond Creek	18N	2E	2		SE	12,243				x
Eighteenmile Creek (=Eighteen Mile)	17N	2E	23		SW	12	x	x		x
Patrick Creek	17N	3E	16		NW	12	x	x		x
Twelvemile Creek (=Twelve Mile)	17N	3E	8		NW	12	x	x		x
Shelly Creek	17N	3E	5		NE	12	x	x		x
Elevenmile Creek (=Eleven Mile)	17N	3E	5		NE	12	x	x		x
Tenmile Creek (=Ten Mile)	18N	3E	32		SE	12	x	x		x
West Fork Patrick Creek	18N	3E	3		NE	12	x	x		x
Monkey Creek	17N	3E	10		NE	12,245	x	x		x
Siskiyou Fork Smith River	17N	3E	11		NW	12,245	x	x		x
Packsaddle Creek	18N	4E	31		SW	12	x	x		x
Griffin Creek (=Griffen)	18N	4E	29		SW	12	x	x		x
Knopti Creek (=Knopki)	18N	4E	27		NW	12	x	x		x
Lake Earl						317		x		x
Jordan Creek	17N	1W	33	SE	SE	12,38,92	x	x		x
Yonker Creek (=Yonkers)						30	x	x		x
Elk Creek	16N	1W	28	SW	NW	12,317	x	x		x
Wilson Creek	14N	1E	18	NW	SW	12,92,143,317	x	x		x
Del Norte/Siskiyou/Humboldt Counties										
Klamath River	13N	1E	5	SE	NW	6,11,14,13,12,308	x	x		x
Hunter Creek	13N	1E	4	SE	NW	13,12,59,89,92,143	x			x
Salt Creek (includes High Praire Creek)	13N	1E	4	SW	NE	12,59,92,143,248,247,317	x	x		x
Mynot Creek (=Minot)	13N	1E	4	NW	NE	12,216,317	x	x		x
East Fork Hunter Creek	14N	1E	23	SW	NW					
Unnamed tributary	14N	1E	13	SW	SW					

Stream	Location					Historical sources	Brown and Moyle 1991	Hassler et al. 1991	Adams et al. 1999	Kier Associates 1999
	T	R	S	¼ of ¼	¼					
Richardson Creek	13N	1E	10	SE	SW	59	x	x		x
Hoppaw Creek	13N	1E	15	NE	NW	12,143	x			x
North Fork Hoppaw Creek										
Waukell Creek	13N	1E	15	SW	NE	12,59	x	x		x
Saugep Creek	13N	1E	15	SE	SE	12,59	x	x		x
Turwar Creek (=Terwer=Turwur)	13N	1E	13		NE	12,59,92,216	x	x		x
McGarvey Creek	13N	1E	24		NE	12,59,92,317	x	x		x
West Fork McGarvey Creek										
Tarup Creek	13N	2E	20		NE	12	x	x		x
Omagar Creek (=Omager=Omagaar)	13N	2E	29		SE	12,59	x	x		x
Blue Creek	13N	3E	34		SW	13,12,59	x	x		x
Pularvasar Creek	12N	2E	15	SW	SE					x
unnamed tributary (=One Mile Creek)										x
West Fork Blue Creek	13N	2E	36		SW	13,12	x	x		x
Potato Patch Creek (=Potatoe Patch)	13N	3E	31		SW	13,12	x	x		x
Nickowitz Creek (=Nikowitz)	12N	4E	6		SW	13,12,59	x	x		x
Crescent City Fork Blue Creek	13N	3E	34		NW	59	x	x		x
Ah Pah Creek	12N	2E	22		NW	13,59	x	x		x
North Fork Ah Pah Creek	12N	2E	22		NW					
South Fork Ah Pah Creek							x			x
Bear Creek	12N	2E	27		NE	59	x	x		x
Tectah Creek	11N	2E	1		SW	13,59	x	x		x
Little Creek (=Surpur)	12N	2E	35		SW					x
Johnson Creek (=Johnsons)	11N	3E	18		NE					x
Pecwan Creek	11N	3E	17		NE	13,59	x	x		x
East Fork Pecwan Creek	11N	3E	17		NE					
Mettah Creek	11N	3E	30		SE	13	x	x		x
Panther (location?)										x
Roach Creek (=Roaches)						59	x	x		x
Miners Creek						59	x	x		x
Tully Creek	10N	3E	25		NE					x
Pine Creek	9N	4E	5		NW	59	x	x		x
Little Pine Creek	9N	3E	24		SW	13	x	x		x
Trinity River	7N	5E	33		SE	11,15,13,21,59	x	x		x
Soctish Creek (=Scottish, Scottish)	8N	4E	10		SE	13,59	x	x		x
North Fork Soctish Creek (=Scottish, Scottish)	8N	4E	9		SE					x
Mill Creek	8N	4E	10		SE	13	x	x		x
Hostler Creek	8N	4E	14		SE	13,59	x	x		x
Supply Creek	8N	4E	25		NW	59	x	x		x
Campbell Creek	7N	5E	6		NE	59	x	x		x

Stream	Location					Historical sources	Brown and Moyle 1991	Hassler et al. 1991	Adams et al. 1999	Kier Associates 1999
	T	R	S	1/4 of 1/4	1/4					
Tish Tang A Tang Creek	7N	5E	5		NW	13,59	x	x		x
Horse Linto Creek	7N	5E	4		SW	13,59,96,181,247	x	x		x
Cedar Creek	7N	5E	4		SE					x
Willow Creek	7N	5E	29		SE	13,28	x	x		x
South Fork Trinity River	6N	5E	15		SE	6,11,15,13,59	x	x		x
Madden Creek	6N	5E	22		NW					x
Eltapom Creek (=Ectapom)	3N	6E	3		SW	15	x	x		x
Hayfork Creek	3N	6E	25		NW	15,59	x	x		x
Olsen Creek	3N	6E	12		SE	15	x	x		x
Butter Creek	2N	6E	12		NE	15	x	x		x
Rattlesnake Creek	1S	8E	19		NE	15,59	x	x		x
Sharber Creek	6N	5E	13		NE					
New River	6N	6E	35		SW	15,59,250	x	x		x
Big Creek						250		x		
East Fork New River	7N	7E	23		NE	250		x		
Pelletreau Creek	3N	6E	23		NW	15	x	x		x
Big French Creek	5N	8E	29		NW					x
Price Creek	33N	12W	5		NW					x
Manzanita Creek	33N	12W	5		NE	15,59	x	x		x
North Fork Trinity River						59	x	x		x
East Fork North Fork Trinity River										x
Indian Creek							x	x		x
Canyon Creek	33N	11W	12		NE	59,98,255	x	x		x
Soldier Creek	33N	10W	29		NW					x
Dutch Creek	32N	10W	5		NE					x
Maxwell Creek										x
Browns Creek						6,59,250	x	x		x
Hazel Gulch										x
Middleton Gulch										x
Dutton Creek (=Dulton)	33N	10W	35		NW					x
Reading Creek	32N	10W	12		SW					x
Weaver Creek	32N	10W	1		SE	204		x		x
East Weaver Creek	33N	9W	18		NW					x
West Weaver Creek	33N	9W	18		NW					x
Indian Creek	32N	9W	5		SW					
Tom Lang Gulch										x
Grass Valley Creek	33N	9W	26		NW					x
Rush Creek	33N	9W	13		NE	9,59	x	x		x
Deadwood Creek	33N	8W	17		NW	9,250	x	x		x
Conner Creek (location?)	34N	11W	36		SW					x

Stream	Location					Historical sources	Brown and Moyle 1991	Hassler et al. 1991	Adams et al. 1999	Kier Associates 1999
	T	R	S	1/4 of 1/4	1/4					
Aikens Creek										x
Bluff Creek	10N	5E	19		SW	13	x	x		x
Slate Creek	10N	5E	19		NE	13,59	x	x		x
Red Cap Gulch (=Red Cap Creek)	10N	5E	15		SW	13,59	x	x		x
Leary Creek	10N	6E	30		NW					x
Boise Creek	10N	5E	2		SE	13,59	x	x		x
Camp Creek	10N	5E	1		NW	13,59,260	x	x		x
Salmon River						6,14,252	x	x		x
Wooley Creek						6,14,59	x	x		x
Haypress Creek										x
Nordheimer Creek						14,59	x	x		x
North Fork Salmon River						14,59	x	x		x
Little North Fork Salmon River										x
Specimen Creek										x
Whites Gulch										x
North Russian Creek						14	x	x		x
South Russian Creek						14,59	x	x		x
South Fork Salmon River						14,59	x	x		x
Knownothing Creek						14,59	x	x		x
Negro Creek						252				x
Methodist Creek						14,59,252	x	x		x
Indian Creek										x
East Fork South Fork Salmon River						14,59,157	x	x		x
Taylor Creek						14,59	x	x		x
Irving Creek						253	x	x		x
Dillon Creek						14	x	x		x
North Fork Dillon Creek										x
Copper Creek										x
Swilupp Creek (=Swilupp)						253		x		x
Coon Creek										
Ukonom Creek						14	x	x		x
King Creek (=Kings)										
Independence Creek						253	x	x		x
Clear Creek						6,14,59	x	x		x
South Fork Clear Creek										x
Oak Flat Creek										x
Elk Creek						14,41,253	x	x		x
East Fork Elk Creek						253	x	x		x
Cougar Creek						253		x		x
Twin Creeks										x

Stream	Location					Historical sources	Brown and Moyle 1991	Hassler et al. 1991	Adams et al. 1999	Kier Associates 1999
	T	R	S	1/4 of 1/4	1/4					
Bear Creek						253		x		x
Beaver Creek (location?)										x
Little Grider Creek										x
Indian Creek						15,14,41,59,251,253	x	x		x
Doolittle Creek										x
South Fork Indian Creek						14,59	x	x		x
East Fork Indian Creek						59,253	x	x		x
Mill Creek						253	x	x		x
China Creek						157,253	x	x		x
Thompson Creek						14,253	x	x		x
Fort Goff Creek										x
Portuguese Creek										x
West Grider Creek						14	x	x		x
Seiad Creek						14,59,251	x	x		x
West Fork Seiad Creek										x
East Fork Seiad Creek										x
Grider Creek						14,59,157	x	x		x
Walker Creek										x
Scott River						6,14,59		x		x
Mill Creek										x
Wooliver Creek										x
Tompkins Creek						14,59	x	x		x
Kelsey Creek						14,254	x	x		x
Canyon Creek						14,254	x	x		x
Boulder Creek										x
Shackelford Creek						14,31,32,59	x	x		x
Mill Creek						14,59,246	x	x		x
Patterson Creek						14,37,155,156	x	x		x
Kidder Creek						14,31,33,59,246	x	x		x
Etna Creek						14,34,59	x	x		x
French Creek						14,59	x	x		x
Miners Creek						14	x	x		x
Sugar Creek						14,59	x	x		x
South Fork Scott River						14	x	x		x
East Fork Scott River						14	x	x		x
Big Mill Creek						14	x	x		x
Grouse Creek	4N	6E	7		SW	13				x
Horse Creek						14,31,59	x	x		x
Buckhorn Creek						14,59	x	x		x
Middle Creek						14	x	x		x

Stream	Location					Historical sources	Brown and Moyle 1991	Hassler et al. 1991	Adams et al. 1999	Kier Associates 1999
	T	R	S	1/4 of 1/4	1/4					
Salt Gulch						14	x	x		x
Barkhouse Creek (=Bark House)						14	x	x		x
Little Humbug Creek										x
Beaver Creek						14,41,59,157	x	x		x
West Fork Beaver Creek						176				x
Cow Creek										x
Grouse Creek										x
Long John Creek (location?)										x
Lumgreys Creek										x
Empire Creek										x
Humbug Creek						14,59	x	x		x
Shasta River						14,55,59,67	x	x		x
Big Springs Creek						14	x	x		x
Fall Creek (location?)						66	x			
Williams Creek										x
Cottonwood Creek						14,59	x	x		x
Klamathon Racks						19	x			
Willow Creek						14,59	x	x		x
Little Bogus Creek										x
Dry Creek										x
Bogus Creek						14,39	x	x		x
Cold Creek										x
Humboldt County										
Redwood Creek	11N	1E	32	NW	SW	11,13,99,143,308	x	x		x
Praire Creek	11N	1E	34	NE	NW	6,13,38,68,92,99,142,247	x	x		x
Little Lost Man Creek	11N	1E	23	NE	NW	13,92	x	x		x
Lost Man Creek	11N	1E	23	NE	NW	13,92	x	x		x
May Creek (=Mae)	11N	1E	14	NE	NW	13,92	x	x		x
Godwood Creek	11N	1E	2	NW	SE	13,22	x	x		x
Boyes Creek	11N	1E	2	NW	SE	92	x			x
Browns Creek						30	x	x		x
North Fork Brown Creek										
South Fork Brown Creek										
Streelaw Creek						30	x	x		x
McArthur Creek	10N	1E	2	SE	SW					
Elam Creek	10N	1E	11	NW	SE					
Tom McDonald Creek	9N	1E	1	NE	NW	13,99	x	x		x
Emerald (location?)										

Stream	Location					Historical sources	Brown and Moyle 1991	Hassler et al. 1991	Adams et al. 1999	Kier Associates 1999
	T	R	S	1/4 of 1/4	1/4					
Bridge Creek	9N	2E	6	SE	SE	13,99	x	x		x
Coyote Creek	8N	2E	2	NE	NW	99	x	x		x
Panther Creek	8N	2E	14	NE	NE	13,99	x	x		x
Lacks Creek	8N	3E	19		SE	6,13	x	x		x
Karen Creek (location?)										
Cole Creek (location?)										
Hayes Creek (location?)										
Davison Creek (location?)										
McDonald Creek (tributary to Stone Lagoon)	10N	1E	29	NW	NW	13,143	x			x
Fresh Creek	10N	1E	29	SE	NW	13	x	x		x
Big Lagoon						7	x			x
Maple Creek	9N	1E	18	SE	SE	38		x		
Pitcher Creek	9N	1E	19	NE	SE					
Little River	7N	1E	6	NW	NW	13,92	x	x		x
South Fork Little River	7N	1E	9	NE	NW	13	x	x		x
Railroad Creek										
Lower South Fork Little River	8N	1E	36	SW	SW	13	x	x		
Upper South Fork Little River	8N	2E	36	SW	SW	13	x	x		
Carson Creek (location?)										
Strawberry Creek	7N	1W	18	SW	NW	13	x	x		x
Mad River	7N	1W	36	NW	NE	6,11,13,142,308	x	x		x
Warren Creek	6N	1E	15	NE	SE	13,308	x	x		x
Lindsay Creek	6N	1E	14	NW	SE	13,92,197	x	x		x
Grassy Creek	6N	1E	11	NW	SE	13,92	x	x		x
Squaw Creek	6N	1E	2	SE	NW	13,143,197	x	x		x
Mather Creek	7N	1E	27	NE	NE	13	x	x		x
Hall Creek	6N	1E	14	SW	SW	13	x	x		x
Noisy Creek	6N	1E	13	SE	SE	13,92	x	x		x
Mill Creek	6N	1E	13	NE	NE	13	x	x		x
Camp Bauer Creek						92	x			x
Powers Creek						30	x	x		x
Leggit Creek	6N	1E	24	NE	SW	13	x	x		x
North Fork Mad River	6N	1E	24	NW	NW	13	x	x		x
Sullivan Gulch (=Sullivan Creek)	6N	2E	28		SW	13	x	x		x
Long Praire Creek	6N	2E	11		SE	13	x	x		x
Kelly Creek (=Kelley)						30	x	x		x
Palmer Creek	6N	2E	30		SW	13	x			x
Quarry Creek	6N	2E	30		SE	13	x	x		x
Dry Creek	5N	2E	8		SE	13	x	x		x
Cannon Creek (=canon)	7N	2E	28		SE	13,197	x	x		x

Stream	Location					Historical sources	Brown and Moyle 1991	Hassler et al. 1991	Adams et al. 1999	Kier Associates 1999
	T	R	S	1/4 of 1/4	1/4					
Maple Creek	4N	3E	6		NW	13	x	x		x
Black Creek						30	x	x		x
Boulder Creek	4N	3E	31	NW	SW	13	x	x		x
McDaniel Slough										
Janes Creek (=Jones)						103	x			x
Jolly Giant Creek	6N	1E	32	SW	SE	13,103	x	x		x
Arcata oxidation ponds						30		x		
Jacoby Creek	5N	1E	4	NW	SW	13,71,103	x	x		x
Rocky Gulch Creek						30	x	x		x
Fay Slough										
Cochran Creek	5N	1E	20	SW	NE	13,103	x	x		x
Eureka Slough										
Freshwater Slough										
Ryan Slough										
Ryan Creek	5N	1E	31	NW	NW	13	x	x		x
tributary to Ryan Creek (location?)										
Henderson Gulch										x
Guptil Gulch										x
Freshwater Creek	5N	1E	29	NW	SW	13,71,99,103,191	x	x		x
McCreedy Gulch						30	x	x		x
Little Freshwater Creek						30	x	x		x
Cloney Gulch	4N	1E	3	NE	SE	13,191	x	x		x
Falls Gulch						30	x	x		x
Graham Gulch	4N	1E	3	SE	SE	13		x		x
South Fork Freshwater Creek						30,191	x	x		x
Elk River	5N	1W	32	NE	SE	13,71,92,99	x	x		x
Swain Slough										
Martin Slough	4N	1E	4	SE	SE	13	x	x		x
North Fork Elk River	4N	1W	26	SW	NE	13,99	x	x		x
McWhinney Creek										
North Branch North Fork Elk River										x
South Branch North Fork Elk River										x
South Fork Elk River	4N	1W	26	SW	NE	13	x	x		x
Tom Gulch										
Little South Fork Elk River	3N	1W	5		NW	13	x	x		x
unnamed creek (=College of Redwoods Creek)						30	x	x		x
Salmon Creek	4N	1W	31	NE	SE	13,71		x		x
Bridge Creek (location?)										x
Humboldt/Mendocino Counties										

Stream	Location					Historical sources	Brown and Moyle 1991	Hassler et al. 1991	Adams et al. 1999	Kier Associates 1999
	T	R	S	¼ of ¼	¼					
Eel River	3N	2W	16	NW	SW	15,13,61,105,183,308	x	x		x
Shaw Creek (tributary to Eel River estuary)						30		x		
Salt River	3N	2W	17	SE	SE	13,178	x	x		x
Cutoff Slough	3N	2W	29	NE	NE					
Smith Creek	3N	2W	29	SW	NE					
Russ Creek	3N	2W	32	NW	SW	13				
Reas Creek	3N	2W	34	NW	SW	13,178	x	x		x
Palmer Creek	3N	2W	34	SW	NW	92	x			x
Rohner Creek	2N	1W	3	NE	NE	178	x			x
Strong's Creek	2N	1W	3	NE	NE					x
Van Duzen River	2N	1W	15	SE	SE	6,11,15,13	x	x		x
Barber Creek	2N	1E	19	SE	SW					
Wolverton Gulch	2N	1E	19	NE	SW	178	x			x
Yager Creek	2N	1E	28	NE	SW	13,59,178	x	x		x
Cooper Mill Creek (=Copper Mill)	2N	1E	15	SE	NW	13,92	x	x		x
Blanton Creek	2N	1E	12	NE	NE					x
Lawrence Creek	2N	2E	6		SE	13,79	x	x		x
Corner Creek										x
Shaw Creek						40,79	x			x
Fish Creek										x
Booths Run (=Booths Creek)										x
Bell Creek										x
South Fork Yager Creek	2N	2E	10		SE					x
North Fork Yager Creek	2N	2E	2		SW					x
Middle Fork Yager Creek										x
Cuddeback Creek						217	x			x
Fielder Creek	2N	1E	26		SE	13,92	x	x		x
Cummings Creek	2N	1E	26		NW		x			x
Hely Creek						92	x			x
Root Creek	1N	2E	16	NE	NE	13	x	x		x
Grizzly Creek	1N	2E	12	SW	NW	13,92,178	x	x		x
Stevens Creek	1N	2E	1	SW	SW	13	x	x		x
Hoagland Creek	1N	3E	14	SW	NE	13	x	x		x
Little Larabee Creek	1N	3E	12	SE	NE	13	x	x		x
unnamed tributary						13		x		
unnamed trib						13		x		
Wilson Creek	2N	1E	21	SE		13,178	x	x		x
South Fork Van Duzen River										
Panther Creek (=Panther; location?)										x
Price Creek						217,312	x	x		x

Stream	Location					Historical sources	Brown and Moyle 1991	Hassler et al. 1991	Adams et al. 1999	Kier Associates 1999
	T	R	S	1/4 of 1/4	1/4					
Howe Creek	2N	1W	35	SW	NW	13,178	x	x		x
Atwell Creek	1N	1W	3	NE	SW	13,178	x	x		x
Nanning Creek	1N	1E	5	SW	NE					x
Monument Creek	1N	1E	18	NW	NE					x
Kiler Creek	1N	1E	20	NW	NE					x
Dinner Creek	1N	1E	21	SW	NW	216	x			x
Twin Creek	1N	1E	21	SW	NE					x
Stitz Creek	1N	1E	22	NW	NE					x
Jordan Creek	1N	1E	26	NE	NW	30,92	x	x		x
Greenlow Creek (=Greenlaw)	1N	1E	26	NW	NE					x
Shively Creek	1N	2E	29	NE	NW	178	x			x
Panther Creek										
Panther Creek tributary (location?)	1N	2E	29	SE	NW					
Bear Creek	1N	2E	32	NE	NW	79	x			x
Chadd Creek	1N	2E	32	NW	SE	13,79,178	x	x		x
Larabee Creek	1S	2E	3	NE	SE	13,178,312	x	x		x
Balcom Creek	1S	2E	1	NE	SW					x
Carson Creek	1S	2E	1	NE	SE	79	x			x
Scott Creek										x
Allen Creek	1S	2E	11	SE	SW					x
All tributaries to Eel River, exact locations uncertain										
Arnold Creek (location?)										x
Atill Creek (location?)										x
Mud Creek (location?)										x
Iber Creek (location?)										x
South Fork Eel River	1S	2E	26	NW	NE	6,9,11,13,61,105,312	x	x		x
Bull Creek	1S	2E	34	NW	NE	13,69,178,312	x	x		x
Connick Creek	1S	2E	29	NE	SE					x
Squaw Creek	1S	2E	30	NE	SE	13,79	x	x		x
Albee Creek	1S	2E	30	SW	NW	13	x	x		x
Mill Creek	1S	1E	25	NE	SW	13	x	x		x
North Fork Cuneo Creek	1S	1E	35	SE	NW					x
Panther Creek	2S	1E	24	NE	NE					
Preacher Gulch	2S	1E	24	NE	NE					
Pollock Creek										x
Mill Creek										x
Mowry Creek										x
Canoe Creek							x			x

Stream	Location					Historical sources	Brown and Moyle 1991	Hassler et al. 1991	Adams et al. 1999	Kier Associates 1999
	T	R	S	¼ of ¼	¼					
Bridge Creek (=Bridges)	2S	3E	20	NE	NE	217	x			x
Elk Creek						216	x			x
Salmon Creek	3S	3E	3	SW	NW	13,216	x	x		x
Mill Creek										
Bear Butte Creek (=Butte)						216	x			x
Fish Creek	3S	3E	11	SE	NE	13,216	x	x		x
Anderson Creek						79	x	x		x
Dean Creek						30,216	x			x
Leggett Creek										x
Redwood Creek	4S	3E	10		SW	13,69,99,178	x	x		x
Seely Creek	4S	3E	9	SE	NW	13,178	x	x		x
Miller Creek	4S	2E	24			178	x			x
China Creek	4S	2E	24		NW	13,178	x	x		x
Dinner Creek	4S	2E	23			178	x			x
Bear Canyon Creek	3S	3E	10			13		x		
Sproul Creek (=Sprowel, Sprowl)	4S	3E	34		SE	13,75,190	x	x		x
Little Sproul Creek	4S	3E	34		SE	13	x	x		x
Warden Creek	5S	3E	5		NE	13	x	x		x
West Fork Sproul Creek	5S	3E	8		NW	13	x	x		x
East Branch West Fork Sproul Creek										
Cox Creek (location?)										x
East Branch of South Fork Eel River	4S	3E	36		SE	13,69	x	x		x
Squaw Creek	4S	4E	33			178	x			x
Schofield Creek						30		x		
Durphy Creek	5S	3E	13		NW	13,178,217	x	x		x
Milk Ranch Creek	5S	3E	24		SE	13,178	x	x		x
Low Gap Creek	5S	3E	24	SW	SE	178	x	x		x
unnamed tributary						312		x		
unnamed tributary						105,312		x		
Indian Creek						312	x	x		x
Jones Creek										x
Moody Creek	24N	18W	5	SE	NE					x
Sebbas Creek	24N	18W	5	NW	NE					x
Coulborn Creek										x
Piercy Creek	5S	3E	35	NW	SE	105	x	x		x
Standley Creek	24N	18W	1		SE	61,178	x	x		x
McCoy Creek	24N	17W	6		SE	61,178	x	x		x
Bear Pen Creek	24N	17W	7	SE	SE	61,178	x	x		x
Cub Creek	24N	17W	18	SW	SW	61,178	x	x		x
Red Mountain Creek	24N	17W	17	SW	NE	178	x			x

Stream	Location					Historical sources	Brown and Moyle 1991	Hassler et al. 1991	Adams et al. 1999	Kier Associates 1999
	T	R	S	¼ of ¼	¼					
Wildcat Creek	24N	17W	20	NW	SE	61,99,105,106,178	x	x		x
unnamed trib	24N	17W	31	NE	NW	61		x		
Hollow Tree Creek	23N	17W	10	NE	SW	61,78,106,178	x	x		x
Mule Creek	23N	17W	29	SE	NW	61,178	x	x		x
Middle Creek	23N	17W	29	NW	SE					x
Walters Creek						61	x	x		x
Redwood Creek	22N	17W	9	NW	NE	61,78,106,178	x	x		x
South Fork Redwood Creek										x
Bond Creek (=Bonds)	22N	17W	15	NE	NW	78,106	x	x		x
Michaels Creek	22N	17W	14			78,178	x	x		x
unnamed trib to Michaels Creek										
Doctors Creek										x
Waldron Creek	22N	17W	14	SW	SW	61,106,178	x	x		x
Butler Creek	22N	17W	24	NW	NW	61,106	x	x		x
Huckleberry Creek	22N	17W	23	SE	SW	61,78,178	x	x		x
Bear Wallow Creek	22N	17W	26	SW	NW					x
Little Bear Wallow Creek										
Bear Creek (location?)										
Cedar Creek	23N	17W	14			61	x	x		x
Low Gap Creek	23N	16W	19	SW	SW	61		x		x
Little Low Gap Creek	23N	17W	25	SE	NE					
Rattlesnake Creek	23N	16W	20	SW	SW	61,178,312	x	x		x
Cummings Creek	23N	15W	19	SE	NE	8,61	x	x		x
Ten Mile Creek	22N	16W	16	NW	SW	61,79,312	x	x		x
Grub Creek	22N	15W	18	NW	NE	61,178	x			x
Streeter Creek (=Streetcar)	22N	15W	22	NW	SW	61,79	x	x		x
Big Rock Creek	22N	15W	29	NE	NE	61,178	x	x		x
Mud Springs Creek	21N	15W	11	NE	NW	61,178	x			x
Mill Creek	21N	15W	11	SW	NE	61,178	x	x		x
Cahto Creek	21N	15W	13		NW	61,178	x	x		x
Barnwell Creek	22N	16W	20	NE	NE	61		x		
Fox Creek	22N	16W	21			178	x			x
Elder Creek	21N	16W	29				x			x
unnamed tributary (location?)						312		x		
unnamed tributary (location?)						312		x		
unnamed tributary (location?)						312		x		
Jack of Hearts Creek	22N	16W	29		SW	61,105,178,186	x	x		x
Deer Creek	21N	16W	4	NE	NW	61,178	x	x		x
Little Charlie Creek	21N	16W	9	NE	NW	61	x	x		x
Dutch Charlie Creek	21N	16W	9		NW	61,79,178	x	x		x

Stream	Location					Historical sources	Brown and Moyle 1991	Hassler et al. 1991	Adams et al. 1999	Kier Associates 1999
	T	R	S	¼ of ¼	¼					
Redwood Creek	21N	16W	16	NW	NW	61,178	x	x		x
Rock Creek	21N	16W	9	SE	SW	61,178,312	x	x		x
Kenny Creek	21N	16W	22	SW	NW	61,178	x	x		x
Haun Creek	21N	16W	26	SW	NW	61	x	x		x
Taylor Creek	21N	16W	25	NW	SW	61,178	x	x		x
Bear Creek	21N	16W	36	NW	NE	61,178	x	x		x
Poison Oak Creek	1S	2E	36	NW	NW					
Newman Creek	1S	2E	25	SE	SW	13,178,216	x	x		x
Kapple Creek	1S	3E	29	SW	SE					
Thompson Creek	1S	3E	29	SE	SE					x
Jewett Creek	4S	5E	11	NW	NW	13,178	x	x		x
Kekawaka Creek	4S	6E	29	NE	NE	30	x	x		x
North Fork Eel River	24N	7E	4	SW	SW					
Bluff Creek						178	x			x
Middle Fork Eel River	22N	13W	6	NW	NE	6,9,11,61,105	x	x		x
Salt Creek	21N	13W	11							x
Rattlesnake Creek	25N	11W	35			178	x			x
North Fork Middle Fork Eel River (location?)	25N	11W	9							
Morrison Camp Creek (=Morrison; location?)	25N	11W	6							
Rock Creek (location?)	26N	11W	32			178	x			x
Elk Creek	21N	11W	9							
Eden Creek	21N	11W	9							
Sanhedrin Creek	20N	11W	8							
Thatcher Creek	21N	11W	7							
Mill Creek	22N	12W	25			178	x			x
Grist Creek	22N	12W	9	NW	NW	61,178	x			x
unnamed tributary	22N	13W	15	SE	NE	61		x		
Williams Creek	23N	11W	31	NW	NW					
Black Butte Creek										
Spanish Creek (location?)										
Outlet Creek	21N	13W	31	SE	SE	79,105,179	x	x		x
Bloody Run Creek	2N	4E	1			105	x			x
Long Valley Creek	20N	14W	28		SW		x			x
Sherwood Creek										
Rowes Creek	19N	14W	23	NW	SW	105	x			x
Ryan Creek	19N	14W	26	NE	NE	79,106	x			x
South Fork Ryan Creek										x
Reeves Canyon	19N	14W	11		SW	79	x			x
Mill Creek	19N	13W	31		SE	105	x			x
Willits Creek	18N	14W	13	NW	NW	79	x			x

Stream	Location					Historical sources	Brown and Moyle 1991	Hassler et al. 1991	Adams et al. 1999	Kier Associates 1999
	T	R	S	¼ of ¼	¼					
Dutch Henry Creek						105	x			x
Broaddus Creek (=Brouddus)	18N	13W	18		NE	79,105	x	x		x
Baechtel Creek	19N	13W	31		SW	79	x			x
Hahl Creek	18N	13W	18		SE	79	x			x
Indian Creek	20N	13W	9	SE	SW	61,178	x			x
Tomki Creek	18N	12W	12	SE	SW					
Scott Creek	18N	12W	8	SE	SE					
Rocktree Creek	19N	13W	36	SE	SE	61,178	x	x		x
String Creek	19N	13W	36	SW	NW	61,178	x	x		x
Tartar Creek (=Tarter)	19N	13W	26			178	x			x
Guthrie Creek	2N	3W	24	SW	NW	13	x	x		x
Bear River	1N	3W	10	SE	SE	13	x	x		x
Bonanza Gulch	1N	2W	16	SW	SE	13	x	x		x
South Fork Bear River	1N	2W	21	NE	NE	13	x	x		x
Hollister Creek	1N	3W	34	SW	NW	13	x	x		x
McNutt Gulch (=McNut)	1S	3W	25	SW	NW	13	x	x		x
Humboldt County										
Mattole River	2S	3W	12	SW	SE	13,106,308	x	x		x
Bear Creek	2S	2W	18	SW	SE	13,75	x	x		x
South Fork Bear Creek	4S	1E	9	SE	NE	197	x			x
Stansberry Creek	2S	2W	18	SW	SE	13		x		
Mill Creek	2S	2W	16	SW	NW					
North Fork Mattole River	2S	2W	4	SE	SE	13	x	x		x
Mill Creek	2S	2W	10	NW	NE	13	x	x		x
Clear Creek	2S	2W	11	SW	NW	13	x	x		x
Conklin Creek	2S	2W	12	NE	SE	13	x	x		x
McGinnis Creek	2S	2W	12	NE	SE	13	x	x		x
Indian Creek	2S	2W	24	NW	NW	13	x	x		x
Squaw Creek	2S	1W	30	SE	NW	13	x	x		x
Pritchard Creek (=Pritchett)	2S	1W	28	SE	SW	13	x	x		x
Granny Creek	2S	1W	28	SW	SW	13	x	x		x
Saunders Creek	2S	1W	33	NW	NE	13	x	x		x
Woods Creek	3S	1W	2	SE	SW	13	x	x		x
Upper North Fork Mattole River	3S	1W	1	NE	NW	13	x	x		
Oil Creek	2S	1E	19	NW	NE	13	x	x		x
Devils Creek	2S	1W	2	SW	NE	13	x	x		x
Rattlesnake Creek	2S	1E	19	NW	NE	13	x	x		x
Honeydew Creek	3S	1E	6	NW	SW	13	x	x		x

Stream	Location					Historical sources	Brown and Moyle 1991	Hassler et al. 1991	Adams et al. 1999	Kier Associates 1999
	T	R	S	1/4 of 1/4	1/4					
Bear Trap Creek	3S	1E	6	SW	SW	13	x	x		x
Dry Creek	3S	1E	9	NE	NE	13	x	x		x
Middle Creek	3S	1E	10	NE	NE	13	x	x		x
Westlund Creek (=Westland)	3S	1E	10	NE	NE	13,30	x	x		x
Gilham Creek	3S	1E	14	SW	NW	13	x	x		x
Fourmile Creek (=Four Mile)	3S	1E	22	SE	NW	13	x	x		x
Sholes Creek	3S	1E	23	SW	SE	13	x	x		x
Harrow Creek	3S	1E	25	NW	NW	13	x	x		x
Grindstone Creek	3S	1E	23	SW	NE	13	x	x		x
Bear Creek	4S	2E	7	NE	NW	13		x		
South Fork Bear Creek	4S	1E	9	SE	NE	197	x			x
Mattole Canyon	3S	2E	31	SW	SW	13	x	x		x
Blue Slide Creek	4S	2E	6	SW	NE	13	x	x		x
Big Finley Creek	4S	2E	30	NE	NW	13	x	x		x
Eubank Creek	4S	2E	30	NE	NW	13	x	x		x
Bridge Creek	5S	2E	5	NW	NE	13	x	x		x
McKee Creek	4S	2E	33	SW	SW	13	x	x		x
Mill Creek						13	x	x		x
Vanauken Creek (=Vanankin =VanArken)	5S	2E	4	NE	SW	13	x	x		x
Baker Creek	5S	2E	4	NE	SW	30	x	x		x
Thompson Creek (=Thompsons)	5S	2E	22		SW	30,106	x	x		x
South Branch Thompson Creek (location?)						106		x		
Yew Creek	6S	2E	27		NW					x
Danny Creek (=Dannys; location?)										x
Lost River	5S	2E	27		NE					x
McNasty Creek (location?)						106		x		
Pipe Creek	5S	2E	34		NE					x
Pollock Creek (location?)										x
CENTRAL CALIFORNIA COAST ESU										
Mendocino County										
Whale Gulch	24N	19W	4		SW	61,234	x	x	x	
Jackass Creek						182,234	x		x	
Usal Creek	23N	18W	22	NE	NW	61,99,143	x	x	x	
South Fork Usal Creek	23N	18W	14	NW	SW					
Soldier Creek										
Cottaneva Creek (=Cottoneva)	22N	18W	26	NW	SE	11,99,234	x	x	x	
South Fork Cottaneva Creek	22N	18W	24	SW	SW	61,105	x	x	x	
Slaughterhouse Gulch	22N	17W	19	NW	SW	233		x	x	

Stream	Location					Historical sources	Brown and Moyle 1991	Hassler et al. 1991	Adams et al. 1999	Kier Associates 1999
	T	R	S	¼ of ¼	¼					
Middle Fork Cottaneva Creek									x	
North Fork Cottaneva Creek						105,106	x	x	x	
Hardy Creek	21N	18W	1	NW	NE	61,234	x	x	x	
Juan Creek	21N	18W	1	NW	NE	61,234	x	x	x	
Little Juan Creek	21N	17W	6		SW	61	x	x	x	
Howard Creek						106,236	x		x	
DeHaven Creek	21N	17W	19	NE	SW	56,61,106,182	x	x	x	
Wages Creek	21N	17W	30		NE	105,106,234	x	x	x	
Abalobadiah Creek	20N	17W	28	NW	SW					
Seaside Creek	20N	17W	33	NW	NW	61		x	x	
Frazer Creek	20N	17W	33	NE	NW	61			x	
Ten Mile River	20N	17W	33		SW	61,234	x	x	x	
South Fork Ten Mile River	19N	17W	3	SW	NW	6,61	x	x	x	
Smith Creek	19N	17W	11	SW	NW	61	x	x	x	
North Fork Smith Creek										
unnamed tributary	19N	16W	7	NE	NW	61		x		
Campbell Creek	19N	17W	14	SE	NE	61	x	x	x	
Churchman Creek (=Churchmans)	19N	16W	20	SE	SW	61	x	x	x	
Redwood Creek	19N	16W	23	SE	NW		x		x	
Gulch Eleven	19N	16W	25		NE	61		x		
Mill Creek	20N	17W	34		SE	61	x	x	x	
North Fork Ten Mile River	20N	17W	25	NW	NW	6,61	x	x	x	
Little North Fork Ten Mile River						61,106	x	x	x	
Buckhorn Creek	20N	17W	13	NW	SW				x	
Bald Hill Creek	20N	16W	9	SW	SE				x	
Middle Fork Ten Mile River (=Clark Fork)	20N	17W	25		NW	61	x	x	x	
Bear Haven Creek							x		x	
Little Bear Haven Creek	20N	16W	33		SE	61		x	x	
Pudding Creek	18N	18W	1	NE	NE	6,61,106	x	x	x	
Little Valley Creek	19N	17W	35		NW	61	x	x	x	
unnamed tributary	19N	17W	26	SE	SW	61		x		
unnamed tributary	19N	17W	26	NE	NW	61		x		
Noyo River	18N	18W	13		NE	6,11,61,105	x	x	x	
Hayshed Gulch	18N	17W	15	NW	NE	61		x	x	
unnamed tributary	18N	15W	17	NW	NE	61		x		
unnamed tributary	18N	15W	15	NE	NE	61		x		
South Fork Noyo River	18N	17W	14		NW	61,106	x	x	x	
Kass Creek	18N	17W	14		SE	36,61,106	x	x	x	
North Fork South Fork Noyo River	18N	16W	30	NW	SE	61,106	x	x	x	
Peterson Gulch									x	

Stream	Location					Historical sources	Brown and Moyle 1991	Hassler et al. 1991	Adams et al. 1999	Kier Associates 1999
	T	R	S	¼ of ¼	¼					
Bear Gulch	18N	16W	29		SW	61		x	x	
Parlin Creek	17N	16W	4	NW	NW	61	x	x	x	
unnamed tributary										
unnamed tributary										
Little North Fork Noyo River	18N	17W	1	SE	SE	22,61,106,233	x	x	x	
Duffy Gulch	18N	16W	12	SE	NE	36,61	x	x	x	
North Fork Noyo River	18N	15W	17	NE	NE	36,61	x	x	x	
Marble Gulch	18N	15W	9		NW	36,61	x	x	x	
Hayworth Creek	19N	15W	33		SW	36,61	x	x	x	
North Fork Hayworth Creek	19N	15W	26		SW					
Middle Fork North Fork Noyo River	19N	15W	29	NE	SE	35,61	x	x		
Dewarren Creek (=DeWarren)	19N	15W	29	NE	NW	36				
unnamed tributary										
Olds Creek	18N	15W	14	NE	NW	36,61	x	x	x	
Redwood Creek	18N	15W	4		NE	36,61,233	x	x	x	
McMullen Creek						36				
Hare Creek	18N	18W	13		SE	61,106	x	x	x	
Covington Gulch						106		x	x	
Bunker Gulch	18N	17W	26	SW	SW	61,106	x	x	x	
South Fork Hare Creek (location?)	18N	17W	27		SE	61,106	x	x	x	
Walton Gulch Creek (location?)						106		x		
Jug Handle Creek	18N	18W	36	NE	SW	61,236	x	x	x	
Caspar Creek	17N	18W	1	NW	SE	10,61,105,106		x	x	
North Fork Casper Creek						247	x	x	x	
South Fork Casper Creek						247	x	x	x	
Blue Gum Creek										
Doyle Creek	17N	17W	26	NW	SW	61,106	x	x	x	
Russian Gulch	17N	17W	18	SW	SW	61	x		x	
Ryan Creek (location?)								x		
Big River	17N	17W	30	SE		6,11,61,105,234	x	x	x	
Railroad Gulch									x	
Little North Fork Big River	17N	17W	24	SW	SE	61	x	x	x	
East Branch Little North Fork Big River	17N	16W	8	SE	SW	106,233	x	x	x	
Berry Gulch	17N	16W	8	NE	SW	106		x	x	
North Fork Berry Gulch						233		x	x	
Two Log Creek	17N	16W	23	SW	NE	105,106,233	x	x	x	
Tramway Gulch	17N	16W	25	SW	SW	233	x	x	x	
North Fork Big River	17N	15W	29	SE		61	x	x	x	
East Branch North Fork Big River	17N	15W	20	NE	NE	61	x			
Bull Pen Gulch (location?)										

Stream	Location					Historical sources	Brown and Moyle 1991	Hassler et al. 1991	Adams et al. 1999	Kier Associates 1999
	T	R	S	1/4 of 1/4	1/4					
Chamberlain Creek	17N	15W	5	SW	SE	61,106	x	x	x	
Water Gulch	17N	15W	5		SE				x	
West Chamberlain (location?)	18N	15W	32	SE	SW				x	
Arvola Gulch	18N	15W	28	SW	SW	61	x	x	x	
James Creek	17N	15W	11	NW		61,233	x	x	x	
North Fork James Creek	18N	15W	35	NE		61	x	x	x	
South Fork Big River	17N	15W	28	SE	SE	61	x	x	x	
Ramon Creek	16N	15W	2	NW	SE		x		x	
North Fork Ramon Creek										
Daugherty Creek (=Dougherty)	16N	14W	19	NE	SW	61	x	x	x	
Gates Creek	16N	14W	32	NW	NE				x	
Johnson Creek	16N	14W	33	NE	NE	233	x	x	x	
Little River	16N	17W	6	SE		61,105,106	x	x	x	
Buckhorn Creek	16N	17W	8	SE	SW	61	x	x	x	
unnamed tributary	16N	17W	8	NE	SE	61		x		
Albion River	16N	17W	21	SW	SW	61,105,106,234	x	x	x	
Deadman Gulch										
Railroad Gulch	16N	17W	23	NE	NE	61	x	x	x	
Pleasant Valley Creek	16N	17W	23	NE	NE				x	
Duckpond Gulch (=Duck Pond)	16N	17W	13	NE	SW					
South Fork Albion River	16N	16W	17	NW	NW	61	x	x	x	
Little North Fork South Fork Albion River										
Bull Team Gulch										
Railroad Gulch (=East Railroad Gulch)	16N	16W	9	SW	NE	61				
Tom Bell Creek	16N	16W	9	NE	NE				x	
North Fork Albion River	16N	17W	11	NE	NE	61	x	x	x	
Soda Springs	17N	16W	35	SE	SE				x	
Marsh Creek (=March)	16N	16W	12	SE		61	x	x	x	
unnamed tributary										
unnamed tributary (=Slaughterhouse Gulch)										
Little Salmon Creek	16N	17W	28		SW	61	x		x	
unnamed tributary	16N	17W	27	SE	SW	61				
Big Salmon Creek	17N	17W	28	SW	SW	61,105,106	x	x	x	
Donnelly Creek									x	
Hazel Gulch	16N	16W	32	NW	SE	61	x	x	x	
West Branch Hazel Gulch	16N	16W	29	SW	NE	61		x	x	
Navarro River	15N	17W	5	SE	NE	6,11,61,105	x	x	x	
Marsh Gulch	15N	17W	11	SE	NE				x	
Murray Gulch	15N	17W	12	SW	SW				x	
North Fork Navarro River	15N	16W	16		SW	61	x	x	x	

Stream	Location					Historical sources	Brown and Moyle 1991	Hassler et al. 1991	Adams et al. 1999	Kier Associates 1999
	T	R	S	¼ of ¼	¼					
Dead Horse Gulch	15N	16W	15	SW	SE				x	
Tramway Gulch									x	
Flynn Creek	15N	16W	13	SE	NW	106	x	x	x	
Camp 16 Gulch									x	
Tank 4 Gulch (=Tank Ford)	16N	16W	36	SE	NE				x	
North Fork Flynn Creek (location?)						105		x		
North Branch North Fork Navarro River	15N	15W	7	NW	SW	61	x	x	x	
Cook Creek	15N	16W	14	NW	SW				x	
John Smith Creek	16N	15W	33	NE	NE	61,106	x	x	x	
Little North Fork Navarro River	16N	15W	33	NE	NE	61	x		x	
South Branch North Fork Navarro River	15N	15W	7		SW	61	x	x	x	
Bridge Creek	15N	14W	19	NE	NE	61	x	x	x	
Mill Creek	14N	15W	3		SW	61	x	x	x	
Indian Creek	14N	14W	19	NW	SE	61	x	x	x	
North Fork Indian Creek	14N	14W	14		NW	61	x	x	x	
Gut Creek	14N	13W	18	SW	NE	61	x	x	x	
Dick Creek	14N	14W	13	SW	NW	61	x	x		
Anderson Creek	14N	14W		SE	SE					
Robinson Creek	13N	14W	2	SW	SE	61		x	x	
Rancheria Creek	15N	14W	19	SW	SE	143	x	x		
Ham Canyon	14N	14W	30		SE	61		x	x	
Horse Creek	13N	15W	1	SE	SE	61	x	x	x	
Minnie Creek	13N	14W	17		NW	61	x	x	x	
Camp Creek	13N	14W	21	NW	NW	61	x	x	x	
German Creek	13N	14W	33	NW	SW	61	x	x	x	
Greenwood Creek	15N	17W	35	NE	NW	61	x	x	x	
Elk Creek	14N	17W	2	NE	SE	61	x	x	x	
South Fork Elk Creek										
Three Springs Creek	14N	16W	25		SW	61	x	x	x	
Soda Fork Creek	14N	15W	31		SE	61	x	x	x	
Sulphur Creek (=Sulphur Fork)	14N	16W	36	SE	NE	61	x	x	x	
Mallo Pass Creek	14N	17W	36	SE	NE	61	x	x	x	
Brush Creek	13N	17W	23	NW	SE	61,233	x	x	x	
Garcia River	13N	17W	34	NW	NE	6,11,61,105,196	x	x	x	
South Fork Garcia River						106,169		x	x	
Fleming Creek	11N	15W	4	SE	NW	106,169		x	x	
Schooner Gulch	12N	16W	32	NW	NE	61	x	x	x	
North Fork Schooner Gulch	12N	16W	29	SE	SE	22,61	x	x	x	
Fish Rock Gulch	11N	15W	18	SW	NE	61	x	x	x	

Stream	Location					Historical sources	Brown and Moyle 1991	Hassler et al. 1991	Adams et al. 1999	Kier Associates 1999
	T	R	S	¼ of ¼	¼					
Sonoma County										
Gualala River	11N	14W	27		SW	6,64,61,68,105,196	x	x	x	
North Fork Gualala River							x			
Little North Fork Gualala River	11N	15W	23		NW	61,106,234		x	x	
Doty Creek	11N	15W	10	NW	NW	61	x	x	x	
South Fork Gualala River	11N	14W	26	NE	NE	64,68	x	x	x	
Buckeye Creek	10N	14W	6	NW	SE				x	
Franchini Creek	10N	14W	1	SE	NW	64	x	x	x	
Wheatfield Fork Gualala River	10N	14W	20	SE	NE	64	x		x	
Fuller Creek	10N	13W	32	SE	NW	8,64,68	x	x	x	
North Fork Fuller Creek	10N	13W	17	NE	SE	64,68		x	x	
South Fork Fuller Creek	10N	13W	17	NE	SE	64,68		x	x	
Haupt Creek	10N	13W	33	SW	SW	8,64,68	x	x	x	
House Creek	9N	12W	6	NE	NW	64	x	x	x	
Marshall Creek	9N	13W	27	NW	NE	64	x	x	x	
Sproule Creek	9N	13W	25	SW	NE	68	x	x	?	
Fort Ross Creek	8N	12W	30	NW	NW	8,64,68	x	x	x	
Russian Gulch						56,61,68,106	x	x	x	
Middle Branch Russian Gulch	7N	12W	11	NW	SW	61	x	x	x	
East Branch Russian Gulch	7N	12W	2	SE	SW	61	x	x	x	
Russian River	12N	11W	25	SE	SE	6,11,64,61,68	x	x	x	
Jenner Gulch	7N	11W	18	NE	SE					
Willow Creek	7N	11W	20	SE	NE	64,68	x	x	x	
Sheephouse Creek	7N	11W	17	NE	SE	64,68	x	x	x	
unnamed tributary	7N	11W	16	NW	NW	64	x	x		
Freezeout Creek	7N	11W	14	NE	SW	64,68	x	x	x	
Austin Creek	7N	11W	11	SE	NW	64,68	x	x	x	
Kohute Gulch	7N	11W	2	SW	NW	64		x	x	
Kidd Creek	8N	11W	34	SW	NW	64,68	x	x	x	
East Austin Creek	9N	12W	24	NW	NE	64,68	x	x	x	
Gilliam Creek	8N	11W	2	SW	SW	64	x	x	x	
Gray Creek	9N	11W	34	NE	NW	8	x		x	
Ward Creek	8N	11W	16	SW	NW	8	x		x	
Red Slide Creek	9N	11W	31	SE	NW	64		x	x	
Dutch Bill Creek	7N	10W	7	NE	SW	64,68,143	x	x	x	
Hulbert Creek	8N	10W	31	NW	SE	143,216	x		x	
Mission Creek	8N	11W	25	SW	SW	68		x	x	
Green Valley Creek	8N	10W	25	SE	SE	248		x	x	
Purrington Creek	7N	9W	19	SE	NE				x	
unnamed tributary										

Stream	Location					Historical sources	Brown and Moyle 1991	Hassler et al. 1991	Adams et al. 1999	Kier Associates 1999
	T	R	S	¼ of ¼	¼					
Mark West Creek	8N	9W	32	NE	SE	64	x		x	
Laguna de Santa Rosa	7N	9W	10	NW	NE					
Santa Rosa Creek (location?)	7N	9W	14	NW	SW					
unnamed tributary (=Griffen Creek; location?)										
Mark Slide Creek (location?)						64,68		x		
Dry Creek	11N	12W	11	SW	SE	64,61,142	x	x	x	
Mill Creek	9N	9W	33	NW	NW	143	x		x	
Felta Creek	9N	9W	32	NE	SW				x	
Wallace Creek	9N	10W	25	NE	SE	143	x		x	
Palmer Creek	9N	10W	34	NE	SE					
Pena Creek	10N	10W	22	SW	NW	143	x		x	
Warm Springs Creek	10N	10W	18	NW	NE		x		x	
Maacama Creek	9N	8W	20	NE	SW					
Redwood Creek										
East Fork Russian River	15N	12W	5	NE	NE	61	x	x	x	
York Creek	16N	12W	33		NW	61	x	x	x	
Forsythe Creek	16N	12W	7	SE	SN		x		x	
Seward Creek	16N	12W	7	SW	NE		x		x	
Eldridge Creek	16N	13W	11		NE		x		x	
Jack Smith Creek	16N	13W	11		NE		x		x	
Mill Creek	17N	13W	36		SW		x			
Salt Hollow Creek	16N	12W	9	SW	SW	61	x	x	x	
Rocky Creek	17N	12W	20	SW	NW	61	x	x	x	
Mariposa Creek	17N	12W	18		SW	61	x	x	x	
Fisher Creek	17N	12W	17	NW	SW	61	x	x	x	
Corral Creek	17N	12W	17		NW	61	x	x	x	
Scotty Creek	6N	11W	9	NW	NE	64,68	x		x	
Salmon Creek	6N	11W	15	SE	SW	6,64,68	x	x	x	
Finley Creek	6N	11W	13	NE	SE	8,64,68	x	x	x	
Coleman Valley Creek	6N	10	13	NW	SW	8,64,68	x	x	x	
Fay Creek	6N	10W	18	SE	SE	8,64,68	x	x	x	
Tannery Creek	6N	10W	19	NE	NE	68	x	x	x	
Valley Ford Creek						6		x		
Coastal Marin County										
Walker Creek	4N	10W	2	SE	NE	60,68,73	x	x	x	
Salmon Creek	4N	8W	30	NW	NE	60	x	x	x	
Arroyo Sausal Creek	4N	8W	30	NW	NE	60	x	x	x	
Lagunitas Creek	4N	9W	22	SE	SE	6,11,60,68,74,90	x	x	x	

Stream	Location					Historical sources	Brown and Moyle 1991	Hassler et al. 1991	Adams et al. 1999	Kier Associates 1999
	T	R	S	1/4 of 1/4	1/4					
Haggerty Gulch Creek	4N	9W	35	NE	NW	60		x	x	
Olema Creek	3N	9W	2	NE	NE	68	x	x	x	
Quarry Gulch										
Giacomini Creek										
Nicasio Creek	4N	8W	29	SW	SW	60	x	x	x	
Devils Gulch Creek	2N	8W	10	SW	SW	60,68,74	x	x	x	
San Geronimo Creek	2N	8W	23	NW	SE	60,68,74	x	x	x	
Bolinas Lagoon								x		
Pine Gulch Creek	1N	8W	24	SE	NE	60,68		x	x	
Redwood Creek	1S	6W	7	SW	NW	60,68	x	x	x	
unnamed tributary (=Kent Creek)										
unnamed tributary (=Fern Creek)										
San Francisco Bay										
Alameda Creek						102	x		x	
San Pablo Creek						146	x		x	
Walnut Creek						145	x		x	
Corte Madera Creek	1N	6W				146	x		x	
San Anselmo Creek	1N	6W				88,146	x		x	
Mill Valley Creek	1N	6W				146	x		x	
San Mateo County										
San Gregorio Creek	7S	5W				307	x	x	x	
Pescadero Creek	7S	5W				62,227,230,307	x	x	x	
Peters Creek	8S	3W	8	NE	SW					
Butano Creek	8S	5W				307	x	x	x	
Gazos Creek	9S	5W				62	x	x	x	
Santa Cruz County										
Waddell Creek	10S	4W	2	SW	NW	230,307	x	x	x	
East Branch Waddell Creek	9S	4W	23	SW	SE	6,63,227,307		x	x	
Henry Creek	9S	4W	11	SE	SW					
Scott Creek	10S	3W				6,63,227,307	x	x	x	
Big Creek	10S	3W	18	NW	NE		x			

Stream	Location					Historical sources	Brown and Moyle 1991	Hassler et al. 1991	Adams et al. 1999	Kier Associates 1999
	T	R	S	¼ of ¼	¼					
San Vicente Creek	11S	3W	4	NW	NE	63	x		x	
San Loreonzo River	11S	1W	19	NE	NW	104	x	x	x	
Hare Creek						6,63,227,307	x	x	x	
Soquel Creek	11S	1W	15	NW	NE	9		x		
Aptos Creek	11S	1E	18	SW	SW	9,307	x	x		
Monterey County										
Carmel River						11	x	x		
Big Sur River						11	x	x		

APPENDIX B

Description

Table B-1 shows modern (1989-2000) presence-absence information for all streams within the Central California Coast and Southern Oregon/Northern California Coasts coho salmon ESUs for which we found some historical or current record of coho salmon occurrence. The geographical organization and naming conventions for this table are identical to those used in Appendix A.

The values in the table are coded as follows:

P (upper case) = stream surveyed and juvenile coho salmon found to be present in the year indicated; the number of fish either >5 or unknown.

p (lower case) = stream surveyed and 5 or fewer juvenile coho salmon observed

A = stream surveyed, no juvenile coho found

{ } = adult survey

[] = literature report; date of actual observation of coho salmon presence or absence not known.

Adult spawning surveys often spanned a portion of two calendar years. In this table, we attribute presence or absence only to the first year of a spawning season (i.e., if coho salmon are observed during the 1991-1992 spawning season, a value of {P} is entered only in 1991.

For all analyses discussed in the text, only data for which year of sampling was known (i.e., all values not in square brackets) were included.

Table B-1. Records of modern occurrence of coho salmon in California streams by year. P = presence of juvenile; p = 5 or fewer juveniles observed; A = absence; { } = adult survey; [] = year of observation unknown, date is publication date.

Stream	Modern presence												References
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
<u>SOUTHERN OREGON/NORTHERN CALIFORNIA ESU</u>													
Del Norte County													
Illinois River													
West Fork Illinois River													
Elk Creek										P			116
Broken Kettle Creek										A			113
South Fork Broken Kettle Creek										P	P		126,133
East Fork Illinois River													
Dunn Creek										p			115
North Fork Dunn Creek										P	P		122,129
South Fork Winchuck River								P	P	P	A	A	224,225
Smith River													
Rowdy Creek	{P}	{P}	{P}	{P}	{P}	{P}	P	{P}	{P}	{P}			210,212
Dominie Creek													
South Fork Rowdy Creek (Low Divide Rd)							P			p			210
Savoy Creek						A							209
Copper Creek							P			p			114,210
Morrison Creek							P		[A]				210,213
Little Mill Creek (=Jaqua or Iaqua)							P		[P]				210,213
Sultan Creek							P		P				202,210,213
Peacock Creek	A						P						4,210,213
Clarks Creek						P	P			P			4,210,213
Rock Creek						[[A]]	[[A]]	{A}	{A}		A		137,210
Mill Creek			P			P	P						4,210,318
West Branch Mill Creek (=West Fork)	{P}	{P}	{P}	P{P}	P{P}	P{P}	P{P}	P{P}	P{P}	P{P}	P{P}	P{P}	2,4,210,211,212,213,214,318
East Branch Mill Creek (=East Fork)					P{P}	P{P}	P{P}	P{P}	P{P}	P{p}	P{p}	P{P}	2,205,206,207
Kelly Creek						P{P}	P	P					206,207
Bummer Lake Creek						{P}	{P}	{P}					2,206,207
Low Divide Creek						[[A]]	[P]{P}						2,207
South Fork Smith River						[P]	P						291,320
Craigs Creek						[A]	P						210,291,320
Coon Creek							P						210
Rock Creek							P						210
Hurdygurdy Creek (=Hurdy Gurdy)			P			A{P}	P			A			140,210,298,291

Stream	Modern presence												References
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
Jones Creek						P	P			A	A		120,137,210,212,213,291
Muzzleloader Creek (=Muzzle Loader)						[A]							298,291
Buck Creek						[A]	A						210,298
Quartz Creek						[A]							298
Eightmile Creek (=Eight Mile)						P	P						210,309,320
Williams Creek													
Prescott Fork Smith River													
Middle Fork Smith River													
Myrtle Creek							A						210
Hardscrabble Creek							A						210
North Fork Smith River					[A]	[A]							291
Stoney Creek (=Stony)						[A]							291
Peridotite Canyon (=Peridotite Creek)													
Still Creek													
Diamond Creek						[A]							291
Bear Creek						A							291
North Fork Diamond Creek						A							291
Eighteenmile Creek (=Eighteen Mile)							A						210
Kelly Creek (location?)							A						210
Patrick Creek						p	P			A			140,210,212,213,291
Twelvemile Creek (=Twelve Mile)													
Shelly Creek					A		P			A	A		125,132,210,213,288
Elevenmile Creek (=Eleven Mile)							A						210
Tenmile Creek (=Ten Mile)							A						210
West Fork Patrick Creek							A						210
Monkey Creek					A	[A]					A		137,288,291
Siskiyou Fork Smith River					[P]	[A]	A						210,286,291
Packsaddle Creek							A						137,210
Griffin Creek (=Griffen)						[A]	A				A		137,291
Knopti Creek (=Knopki)						[A]	A				A		137,210,291
Lake Earl													
Jordan Creek													
Yonker Creek (=Yonkers)													
Elk Creek													
Wilson Creek					P	A			[A]				4,235
Del Norte/Siskiyou/Humboldt Counties													

Stream	Modern presence												References
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
Klamath River	{p}			{P}	{p}	{p}		{p}	{P}	{P}			54
Hunter Creek		P				P		P	P	P	P	P	309,310,315,316
Salt Creek (includes High Praire Creek)									A				315
Mynot Creek (=Minot)								A	A	P	p	P	315,316
East Fork Hunter Creek										P	P		315
unnamed tributary										P			315
Richardson Creek													
Hoppaw Creek						P		P	P	p	P	P	168,315,316
North Fork Hoppaw Creek								P	P		P	A	315
Waukell Creek									p			A	315
Saugep Creek								p	P				315,316
Turwar Creek (=Terwer=Turwur)						P		p	A	P	P	P	168,315,316
McGarvey Creek						P		P	p	P	P	P	168,315,316
West Fork McGarvey Creek								P		P			315
Tarup Creek						P		P	p	P			168,315,316
Omagar Creek (=Omager=Omagaar)								p	p	A			315,316
Blue Creek	P	P	P	P	P	P	p{p}	P{P}	P{P}	P{P}	P{P}	P{P}	310,315,316
Pularvasar Creek								p		p			315,316
unnamed tributary (=One Mile Creek)								p					315,316
West Fork Blue Creek								A				p	315
Potato Patch Creek (=Potatoe Patch)													
Nickowitz Creek (=Nikowitz)								A					316
Crescent City Fork Blue Creek							P	P	P	P	P		315
Ah Pah Creek						P			P	P		p	168,315
North Fork Ah Pah Creek									A	A		A	315
South Fork Ah Pah Creek			P			P			P	P			168,199,202,315
Bear Creek		P						p	A	A	P		310,315,316
Tectah Creek		P				P		P	A	A	A	A	168,310,315
Little Creek (=Surpur)								p	p				315,316
Johnson Creek (=Johnsons)								P	P	A	P		315,316
Pecwan Creek								P	A	A	p		315
East Fork Pecwan Creek										A		p	315
Mettah Creek									A	A	p	P	315
Panther (location?)		P											309
Roach Creek (=Roaches)								P	p	A	P	P	315,316
Miners Creek													
Tully Creek		P						A		A	P	p	309,315,316
Pine Creek				P	p	A	P	A	P	P	p	A	58,315

Stream	Modern presence												References
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
Little Pine Creek													
Trinity River	{P}	{P}	{P}	{P}	{P}	{P}	{P}	{P}	{P}		P{P}	P	226
Soctish Creek (=Scotish, Scottish)													
North Fork Soctish Creek (=Scotish, Scottish)						P							188
Mill Creek				P	P	P	P	p	P	A	A	P	58
Hostler Creek						P			A	A	P	p	58
Supply Creek				P	p	P	p	A	P	p	p	P	58
Campbell Creek									p	p	A	A	58
Tish Tang A Tang Creek				p	P	P	A	A	P	P	A	P	58
Horse Linto Creek		P	P	P	P	P	P	P	p	A			16,118,237,275,274,297,301,306,319
Cedar Creek			P										272,271
Willow Creek		P	P	P{P}	P{P}	{P}	A	p	A	A	p		242,266,281,275,289
South Fork Trinity River	{P}		A			P							138,270,291
Madden Creek				P		[P]				P			121,281,291
Eltapom Creek (=Ectapom)													
Hayfork Creek				A		A							280,291
Olsen Creek		A											265
Butter Creek		A											265
Rattlesnake Creek	A					A							259,291
Sharber Creek										P	P		124,131,291
New River				A		A							280
Big Creek													
East Fork New River													
Pelletreau Creek					A								285
Big French Creek						[A]				P	A		112,137,140,291
Price Creek						[P]				A			140,291
Manzanita Creek			P										267
North Fork Trinity River						[P]				A			140,291
East Fork North Fork Trinity River	P					[P]				P			140,296,305
Indian Creek			{P}	{P}	{P}								221,222,223
Canyon Creek						[P]				P			140,296
Soldier Creek				{P}	{P}	{P}							221,221,222,222,223
Dutch Creek		P								A	P		219,219,223,265
Maxwell Creek				{P}	{P}								221,222
Browns Creek		P											219,223
Hazel Gulch				{P}	{P}								221,222
Middleton Gulch			P										220
Dutton Creek (=Dulton)				{P}	{P}								221,222
Reading Creek		P											219,265

Stream	Modern presence												References
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
Weaver Creek		P		{P}	{P}								221,222,311
East Weaver Creek		P											311
West Weaver Creek		P											219,311
Indian Creek			P	P						A	A		119,137
Tom Lang Gulch	{P}	{P}	{P}	{P}									218,219,220,221
Grass Valley Creek				{P}									221,222
Rush Creek			P	P{P}	P{P}	P				P			140,221,222,291
Deadwood Creek		P		{P}	{P}								85,86,221,222,265
Conner Creek (location?)		P											265
Aikens Creek					P								290
Bluff Creek	P				P	A							287,299
Slate Creek		P											266
Red Cap Gulch (=Red Cap Creek)	P		P	P		P							260,273,282,299
Leary Creek						P							299
Boise Creek						[A]							291
Camp Creek	P		P	P		P				P			140,204,261,273,282,299
Salmon River													
Wooley Creek				P									276
Haypress Creek						P							292
Nordheimer Creek													
North Fork Salmon River	P	P				P							252,263,292
Little North Fork Salmon River						P							292
Specimen Creek						P							292
Whites Gulch						P							292
North Russian Creek										A			140
South Russian Creek						P				A			140,294
South Fork Salmon River	P	P				P							252,263,292
Knownothing Creek	P			P						P			141,252,276
Negro Creek													
Methodist Creek	P			P						A			140,252,276
Indian Creek				P									277
East Fork South Fork Salmon River			[P]	P						A			19,140,277
Taylor Creek				P						A			140,277
Irving Creek			[P]			P							19,293
Dillon Creek						P							293
North Fork Dillon Creek						P							293
Copper Creek						P							293
Swillup Creek (=Swillop)						[P]				P			140,291
Coon Creek						[A]							291

Stream	Modern presence												References
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
Ukonom Creek						[A]							291
King Creek (=Kings)						[A]							291
Independence Creek		{P}	P			P							50,264
Clear Creek				P		[A]				A			140,278,291
South Fork Clear Creek						P							293
Oak Flat Creek					P								284
Elk Creek	{P}	P{P}	P	P	P{P}	P				P			91,257,264,278,284,293
East Fork Elk Creek		P	P							P			91,264
Cougar Creek													
Twin Creeks						P							293
Bear Creek													
Beaver Creek (location?)	P												257
Little Grider Creek				P									269
Indian Creek	P{P}		{P}		{P}	P							257,284,293,303
Doolittle Creek		P	P										264,269
South Fork Indian Creek													
East Fork Indian Creek			P										269
Mill Creek			P	P									269
China Creek			P						P				269,303
Thompson Creek		P								A			140,264
Fort Goff Creek				P						P			85
Portuguese Creek				P						P			85
West Grider Creek													
Seiad Creek			P	P		[P]				P	P		123,130,140,268,277
West Fork Seiad Creek				P									85
East Fork Seiad Creek				P									85
Grider Creek	P		P		P					A			44,82,140,256,283
Walker Creek			P										84,268
Scott River	P					P		P	P				161,162,258,295,300,304
Mill Creek						[P]							291
Wooliver Creek									P				304
Tompkins Creek										A			140
Kelsey Creek						P				A			140,295
Canyon Creek						P				A			50,140
Boulder Creek						P							50
Shackelford Creek					P			P	A				48,161,300,304
Mill Creek				P				P					46,161,279
Patterson Creek						P		A	A				159,173,300,304
Kidder Creek					P			P	P				48,161,162,300,304

Stream	Modern presence												References
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
Etna Creek						[A]		A	A				291,300,304
French Creek					P	P		P	A				159,161,283,300,304
Miners Creek					P	P							158,159,283
Sugar Creek						P		P	P				159,300,304
South Fork Scott River						P		P					159,161,291
East Fork Scott River						P							159
Big Mill Creek													
Grouse Creek						P							159
Horse Creek		P		P		P				P			83,117,140,277,291
Buckhorn Creek									A				173
Middle Creek		P							A				83,262
Salt Gulch						A				P			140,291
Barkhouse Creek (=Bark House)										A			140
Little Humbug Creek										P			140
Beaver Creek	P{P}		P	P				P	P	p			20,44,87,111,140,173,256,277
West Fork Beaver Creek	P								A				82,302
Cow Creek				P					A				81,173
Grouse Creek				P									81
Long John Creek (location?)	P			P									81,82
Lumgreys Creek		P							A	A			83,140
Empire Creek				P					A				173,177
Humbug Creek	P			P						P	P		82,128,140,277
Shasta River	P												256
Big Springs Creek													
Fall Creek (location?)													
Williams Creek					P								48
Cottonwood Creek					P				A				86,173
Klamathon Racks													
Willow Creek													
Little Bogus Creek							P	P	P				160,161,162
Dry Creek							P	P					161,162
Bogus Creek						P							50
Cold Creek						P							50
Humboldt County													
Redwood Creek			[P]	{P}									203
Prairie Creek	{P}	{P}	[P]{P}	{P}	{P}	P{P}		P	P{P}	P{P}	P	P	29,167,203
Little Lost Man Creek						P	P		P			P	4,167,203

Stream	Modern presence												References
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
Lost Man Creek	{P}	{P}	{P}	{P}		{P}	P						4,203
May Creek (=Mae)						P		P	P				4
Godwood Creek									P				4
Boyes Creek									P	{p}	P		4,29
Browns Creek							A				P	P	4,167
North Fork Brown Creek									P				4
South Fork Brown Creek									P				4
Streelow Creek						P				P{P}	P	P	4,29,167
McArthur Creek							P						4
Elam Creek											P		167
Tom McDonald Creek				P		P						P	4
Emerald (location?)						P							4
Bridge Creek				P	P			A				A	4
Coyote Creek								A					
Panther Creek						A							
Lacks Creek								A					4
Karen Creek (location?)													4
Cole Creek (location?)												P	100
Hayes Creek (location?)												P	100
Davison Creek (location?)												P	100
McDonald Creek (tributary to Stone Lagoon)													
Fresh Creek													
Big Lagoon													
Maple Creek												P	167
Pitcher Creek												P	167
Little River											P	P	167
South Fork Little River										{P}	{P}		167
Railroad Creek										P	P	P	225
Lower South Fork Little River										P{P}	P{P}	P	167,225
Upper South Fork Little River										P	P	P	225
Carson Creek (location?)												P	225
Strawberry Creek													
Mad River					P							P	287
Warren Creek	P												198
Lindsay Creek							P						200
Grassy Creek													
Squaw Creek													
Mather Creek													
Hall Creek													

Stream	Modern presence												References
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
Noisy Creek													
Mill Creek													
Camp Bauer Creek													
Powers Creek													
Leggit Creek													
North Fork Mad River									{P}			P	167,202,225
Sullivan Gulch (=Sullivan Creek)								{P}	{P}	{P}	P{P}	P	167,202
Long Praire Creek													
Kelly Creek													
Palmer Creek													
Quarry Creek													
Dry Creek													
Cannon Creek (=Canon)		P	[P]				P{P}	A{P}	P{P}		P{P}	P{P}	167,225
Maple Creek													
Black Creek													
Boulder Creek													
McDaniel Slough													
Janes Creek (=Jones)													
Jolly Giant Creek													
Arcata oxidation ponds													
Jacoby Creek												P	167
Rocky Gulch Creek													
Fay Slough													
Cochran Creek													
Eureka Slough													
Freshwater Slough													
Ryan Slough													
Ryan Creek							P						51
tributary to Ryan Creek (location?)							P						51
Henderson Gulch								P					150
Guptil Gulch								P					150
Freshwater Creek	P	P	P	P	P	P		P	P	P	P	P	144,167,193,202
McCready Gulch								P		A	P	P	144,167,202
Little Freshwater Creek	P	P	P	P	P	P			P				40,144,193,202
Cloney Gulch						P		P	P			P	40,49,167,202
Falls Gulch		P				P			P		P		49,144,167,202
Graham Gulch								P	P			A	144,167,191,193,202
South Fork Freshwater Creek	P	P	P	P	P	P		P	P				193,202
Elk River	P	P	P	P	P	P							51

Stream	Modern presence												References
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
Swain Slough													51
Martin Slough													
North Fork Elk River		P				P			{P}	P	P	P	42,49,144,149,167,202
McWhinney Creek												A	167
North Branch North Fork Elk River		P				p				P	P	P	42,49,144,189,302
South Branch North Fork Elk River		P				P			{P}		P	P	23,42,49,144,189,202
South Fork Elk River						P						P	144,167
Tom Gulch											P		167
Little South Fork Elk River												P	167
unnamed creek (=College of Redwoods Creek)													
Salmon Creek								P				A	167,201
Bridge Creek (location?)		P											42
Humboldt/Mendocino Counties													
Eel River													
Shaw Creek (tributary to Eel River estuary)	P	P	P	P	P	P							193
Salt River													
Cutoff Slough													
Smith Creek													
Russ Creek													
Reas Creek													
Palmer Creek													
Rohner Creek													
Strong's Creek							P						51
Van Duzen River					A								286
Barber Creek													
Wolverton Gulch													
Yager Creek			P		P	P							144,192,194,291
Cooper Mill Creek (=Copper Mill)			A		P	P							144,192,194
Blanton Creek			A		P	P							144,192,194
Lawrence Creek			p{p}	p	Pp	P	p						47,49,144
Corner Creek			A		P	P							144,192,194
Shaw Creek	P	P	P	P{p}	P{p}	P	P						24,42,45,47,49,101,144
Fish Creek					P	P							192,194
Booths Run (=Booths Creek)			A		P	P							144,192,194
Bell Creek			A	A	P	P							144,192,194
South Fork Yager Creek			A		P	P							144,192,194
North Fork Yager Creek			A		P	P							144,192,194

Stream	Modern presence												References
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
Middle Fork Yager Creek			A		P	P							144,192,194
Cuddeback Creek													
Fielder Creek													
Cummings Creek			A				P						51,144
Hely Creek			A				P						51,144
Root Creek			P										43,144
Grizzly Creek							P						51
Stevens Creek			P				P						51,144
Hoagland Creek													
Little Larabee Creek			A										144
unnamed trib													
unnamed trib													
Wilson Creek													
South Fork Van Duzen River													
Panther Creek (=Panther, location?)				P									45
Price Creek													
Howe Creek													
Atwell Creek													
Nanning Creek				P									45,49,144
Monument Creek				P									45,144
Kiler Creek				A			P						51,144
Dinner Creek							P						51
Twin Creek		A					P						51,144
Stitz Creek				A			P						51,144
Jordan Creek			p				{P}						51,144
Greenlow Creek (=Greenlaw)			A				P						51,144
Shively Creek			A				P						51,144
Panther Creek													
Panther Creek tributary (location?)				P									45
Bear Creek			A		P		{P}						51,144
Chadd Creek			p	P			P						51,144
Larabee Creek				A			P						51,144
Balcom Creek				A			P						51
Carson Creek			[P]	A			P						51,144
Scott Creek			A	P									45,144
Allen Creek							P						51
All tributaries to Eel River, exact location uncertain													
Arnold Creek (location?)							P						51

Stream	Modern presence												References
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
Atill Creek (location?)							P						51
Mud Creek (location?)							P						51
Iber Creek (location?)							P						51
South Fork Eel River	P	P	P	P	P	P			{P}				40,42,43,45,47,49,202
Bull Creek													
Connick Creek					P								26
Squaw Creek													
Albee Creek			A										144
Mill Creek		P											42
North Fork Cuneo Creek			P										43
Panther Creek				P									40
Preacher Gulch				P									45
Pollock Creek					P				{P}				47,53
Mill Creek				P				A				A	45,152,170
Mowry Creek					P								47
Canoe Creek													
Bridge Creek (=Bridges)													
Elk Creek							P						97
Salmon Creek				P									45,144
Mill Creek		P											42
Bear Butte Creek (=Butte)													
Fish Creek					P								26
Anderson Creek					P								144
Dean Creek				A									144
Leggett Creek				P									25
Redwood Creek			P				P			p{P}	P		43,70,97,106,135,144,147
Seely Creek													
Miller Creek							P						51
China Creek								{P}					51,52
Dinner Creek									{P}				53
Bear Canyon Creek				P									25
Sproul Creek (=Sprowel, Sprowl)								{P}	{P}			P	52,53,147,314
Little Sproul Creek								P					52
Warden Creek													
West Fork Sproul Creek					P						P	P	47,136,314
East Branch West Fork Sproul Creek					P						P		47,314
Cox Creek (location?)					P								47
East Branch of South Fork Eel River													

Stream	Modern presence												References
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
Squaw Creek													
Schofield Creek													
Durphy Creek													
Milk Ranch Creek					P								47
Low Gap Creek		P											23
unnamed tributary (location?)													
unnamed tributary (location?)													
Indian Creek					P	P	P	P	P	p	P		57,144
Jones Creek					P								25
Moody Creek					P								47,144
Sebbas Creek					P								26,47,144
Coulborn Creek					P								26,144
Piercy Creek		P					P	P	p	P	P	A	42,57
Standley Creek				P			P						57,144
McCoy Creek													
Bear Pen Creek				p									144
Cub Creek													
Red Mountain Creek													
Wildcat Creek				p									144
unnamed tributary													
Hollow Tree Creek	P	P{p}	P{P}	P{P}	P{P}	P{P}	P{P}	P{A}	P	P{P}	P	P	23,40,43,52,53,94,95,144,152,172,170
Mule Creek						A	A	A				A	152,170
Middle Creek				P			A	A				A	45,144,151,152,170
Walters Creek						A	A	A				A	152,170
Redwood Creek			P			P	P	P				P	43,152,170
South Fork Redwood Creek						P	P	P				P	148,149,150,152,170
Bond Creek (=Bonds)	P	P				P	P	P				p	95,148,150,152,170,218
Michaels Creek						P	P	P				P	148,149,150,152,170
unnamed trib to Michaels Creek												P	139
Doctors Creek						A	P	P				p	149,150,151,152,170
Waldron Creek	A	A	A		P	A	A	A				A	47,95,152,170
Butler Creek		P				P	P	P				P	144,148,149,150,170
Huckleberry Creek		P				P	P	P				P	144,148,149,150,170
Bear Wallow Creek		P				P{P}	P{P}	P{P}				P	144,148,149,150,152,170
Little Bear Wallow Creek						P	A	P				P	148,149,150,152,170
Bear Creek (location?)			P										144
Cedar Creek								A					95
Low Gap Creek		P											23
Little Low Gap Creek													

Stream	Modern presence													References
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000		
Rattlesnake Creek					P								47	
Cummings Creek														
Ten Mile Creek														
Grub Creek														
Streeter Creek (=Streetcar)														
Big Rock Creek						P							27	
Mud Springs Creek														
Mill Creek														
Cahto Creek					A								95	
Barnwell Creek														
Fox Creek													45,144,150,152,170	
Elder Creek														
unnamed tributary (location?)														
unnamed tributary (location?)														
unnamed tributary (location?)														
Jack of Hearts Creek				P				P				p	45,144,150,152,170	
Deer Creek														
Little Charlie Creek														
Dutch Charlie Creek				P			P	P	P	P	P	P	57,144	
Redwood Creek							P	P	P	P	P	P	57,170	
Rock Creek				P									45	
Kenny Creek														
Haun Creek														
Taylor Creek														
Bear Creek														
Poison Oak Creek					P								26	
Newman Creek														
Kapple Creek				A			P						51,144	
Thompson Creek							P						51	
Jewett Creek														
Kekawaka Creek														
North Fork Eel River														
Bluff Creek														
Middle Fork Eel River		A	A	A	A	A	A	A	A	A	A	A	95,140,291	
Salt Creek						P							49	
Rattlesnake Creek						[A]				A			140,291	
North Fork Middle Fork Eel River (location?)						[A]				A			140,291	
Morrison Camp Creek (=Morrison; location?)						[A]							291	
Rock Creek (location?)						[A]							291	

Stream	Modern presence												References
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
Elk Creek						[A]							291
Eden Creek						[A]							291
Sanhedrin Creek						[A]							291
Thatcher Creek						[A]							291
Mill Creek													
Grist Creek													
unnamed tributary													
Williams Creek						[A]							291
Black Butte Creek						[A]							291
Spanish Creek (location?)						[A]							291
Outlet Creek	A		[P]				P						51,95,106
Bloody Run Creek			[P]										
Long Valley Creek			[P]				{P}						51
Sherwood Creek													
Rowes Creek	A												95
Ryan Creek	P	A{A}	A{A}	P{A}	p{A}	A{A}	P{A}	A{A}	A{A}	A{A}	A{A}	A	51,94,95
South Fork Ryan Creek								P					150
Reeves Canyon			[P]										
Mill Creek						A							95
Willits Creek			A							A	A	A	95
Dutch Henry Creek													
Broadbuddus Creek (=Brouddus)	A	p											95
Baechtel Creek													
Haehl Creek													
Indian Creek													
Tomki Creek													
Scott Creek													
Rocktree Creek													
String Creek													
Tartar Creek (=Tarter)													
Guthrie Creek													
Bear River													
Bonanza Gulch								A					144
South Fork Bear River													
Hollister Creek													
McNutt Gulch (=McNut)													
Humboldt County													

Stream	Modern presence												References
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
Mattole River			P				{P}	P{P}	P{P}	P{P}		P{p}	106,140,195,202,208
Bear Creek							{P}		P	P			140,163,202,208
Stansberry Creek													
Mill Creek			P	P	P	P	P	P	P	A	P	A{A}	195
North Fork Mattole River													
Mill Creek			P	P	P	P	P	P	P	A	P	A	208
Clear Creek													
Conklin Creek													
McGinnis Creek									{P}				202
Indian Creek													
Squaw Creek				A								{A}	195
Pritchard Creek (=Pritchett)													
Granny Creek													
Saunders Creek													
Woods Creek													
Upper North Fork Mattole River										P			208
Oil Creek			A	A	A	A	A						101,144
Devils Creek													
Rattlesnake Creek			A	A	A	A							144
Honeydew Creek						A		A	A	A	A	A{A}	195,208
Bear Trap Creek													
Dry Creek													
Middle Creek													
Westlund Creek (=Westland)										P		A	208
Gilham Creek													
Fourmile Creek (=Four Mile)													
Sholes Creek													
Harrow Creek													
Grindstone Creek													
Bear Creek								{P}		P	A	A{A}	208,215
South Fork Bear Creek								{P}	{P}	P{P}	P	P{A}	165,166,208
Mattole Canyon							{P}						163
Blue Slide Creek										A	A	A	208
Big Finley Creek						P		P		P	P		140,208
Eubank Creek						p							208
Bridge Creek										P		{A}	140,195,208
McKee Creek									P			{A}	195,215
Mill Creek													
Vanauken Creek (=Vanankin =VanArken)										A	A	A	208

Stream	Modern presence												References
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
Baker Creek							P	{p}	{P}	P{P}	p	A{p}	127,164,166,200,208,215,215
Thompson Creek (=Thompsons)						P		P	P{P}	P{P}	P	P{A}	134,140,201,208,215
South Branch Thompson Creek (location?)													
Yew Creek						P	{P}	P	P	P{P}	P	P{p}	140,163,166,201,208
Danny Creek (=Dannys, location?)										{P}		{A}	166,195
Lost River								P	P	P	P	A	140,208,215
McNasty Creek (location?)													
Pipe Creek										P		{A}	140
Pollock Creek (location?)					P				P				72
<u>CENTRAL CALIFORNIA COAST ESU</u>													
Mendocino County													
Whale Gulch													
Jackass Creek													
Usal Creek													
South Fork Usal Creek					P	A	A	P	A	A	A	A	57,95
Soldier Creek						A	A	p	A	A	A	A	57
Cottaneva Creek (=Cottoneva Creek)						P	A	A			{A}	P	152,171,170
South Fork Cottaneva Creek						P	P	P				P	152,170
Slaughterhouse Gulch						A	A	P				p	152,170
Middle Fork Cottaneva Creek						P	A	P				A	152,170
North Fork Cottaneva Creek						P	A	P				A	152,170
Hardy Creek						A	A	A				A	152,170
Juan Creek						A	A	A				A	152,170
Little Juan Creek						A	A	A				A	152,170
Howard Creek	A	A	A			A	A	A		p	A{A}	P	95,152,170
DeHaven Creek	A	A	A	A	A	A	A	A		A	A{A}	A	57,95
Wages Creek	A	A	A	A	A	A	P*			p	p{A}	P	57,93,95
Abalobadiah Creek					A	A	A	A	A	A	A		57
Seaside Creek													
Frazer Creek													
Ten Mile River													
South Fork Ten Mile River			A		A	A	A{P}	P	A	A	p	A	57,95,153
Smith Creek			A		A	A	p{p}	P{p}	P	A	A	A	57,95,153,154
North Fork Smith Creek								{A}					154
unnamed tributary													
Campbell Creek			A		P	P	p{P}	P{A}	p	A	p	A	57,95

Stream	Modern presence												References
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
Churchman Creek (=Churchmans)					A	A	A{p}	P	P	p	p	A	57
Redwood Creek					p	A	A	A	A	A	A	A	57
Gulch Eleven													
Mill Creek					A	A	A	A	A	p	A	A	57
North Fork Ten Mile River			A		A	A	A	P	A	A	p	A	57,95
Little North Fork Ten Mile River			A		P	A	A{P}	P	p	p	p	p	57,95,153
Buckhorn Creek			A		A	A	A	P	A	A	A		57,95
Bald Hill Creek			p		A	A	A	p	A	A	A	A	57,95
Middle Fork Ten Mile River (=Clark Fork)	A		A		A	A	A{P}	p	A	A	A	A	57,95,153
Bear Haven Creek			P		p	A	A{P}	p	P	A	P	p	57,95,153
Little Bear Haven Creek			A		A	A	A	A	A	A	A	A	57,95
Pudding Creek	P	p	P	P	P	p	P	P	P	P	P{A}	P	57,94,95
Little Valley Creek					P		A						57
unnamed tributary													
unnamed tributary													
Noyo River	A					P	P	P			{P}	P	94,95,152,170
Hayshed Gulch								P	P	p	p	P	57
unnamed tributary													
unnamed tributary													
South Fork Noyo River	{P}	{P}	{P}	{P}	{P}	{P}	{P}	{P}	{P}	P{P}	{P}	P	93,107,108,109,110,321
Kass Creek					P	A	P	P	P	P	P	P	57
North Fork South Fork Noyo River										P		P	93,107,321
Peterson Gulch												A	321
Bear Gulch												P	321
Parlin Creek												P	321
unnamed tributary												p	321
unnamed tributary							P	P					152
Little North Fork Noyo River				P		P	P	P	P	P	P{A}	P	57,93,95,313
Duffy Gulch					p	P	p	p	P	A	A	A	57
North Fork Noyo River						P	A	P				p	152,170
Marble Gulch								P				A	152,170
Hayworth Creek						P	A	P				A	152,170
North Fork Hayworth Creek						A	A	P				A	152,170
Middle Fork North Fork Noyo River						P	A	P				A	152,170
Dewarren Creek (=DeWarren)						A	A	A					152
unnamed tributary								P					152
Olds Creek								A				A	152,170
Redwood Creek	P					P	P	P				A	95,152,170
McMullen Creek							A	A					152

Stream	Modern presence												References
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
Hare Creek	P									P	P	P	93,95
Covington Gulch													
Bunker Gulch													
South Fork Hare Creek (location?)													
Walton Gulch Creek (location?)													
Jug Handle Creek							A						95
Casper Creek	P	P{p}	P{P}	P{p}	P{P}	P{P}	P{P}	P{P}	P{P}	P{P}	P{P}	P	93,95,153
North Fork Casper Creek							{P}	{p}					153,154
South Fork Casper Creek							{P}	{p}					153,154
Blue Gum Creek					p								95
Doyle Creek													
Russian Gulch												A	93
Ryan Creek (location?)													
Big River					A	A	A	P				p	152,170
Railroad Gulch							p						95
Little North Fork Big River					P	P	P	P	P	P	P{A}	P	57
East Branch Little North Fork Big River													
Berry Gulch							P						95
North Fork Berry Gulch													
Two Log Creek					p	A	P	P	P	p	P	P	57,152,170
Tramway Gulch						A	A	A				A	152,170
North Fork Big River						A	A	P			{A}	A	95,152,170
East Branch North Fork Big River						A	A	P				A	152,170
Bull Pen Gulch (location?)								P					152
Chamberlain Creek											{A}		93
Water Gulch													
West Chamberlain (location?)													
Arvola Gulch													
James Creek					A		A						95
North Fork James Creek													
South Fork Big River						A	A	P				A	152,170
Ramon Creek						A	P	P				A	152,170
North Fork Ramon Creek						A	P	A				A	152,170
Daugherty Creek (=Dougherty)						A	A	P				A	152,170
Gates Creek		A	A	A	A	A	A	P				A	95,152,169,170
Johnson Creek						A	A	A				A	152,170
Little River	P	P{A}	P{P}	p{p}	P{A}	P{p}	P{P}	P{A}	P{A}	P{p}	P{P}	P	93,95
Buckhorn Creek												A	170
unnamed trib												A	170

Stream	Modern presence												References
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
Albion River	P	P	P	P	P	P	P	P			P	P	95,152,169,170
Deadman Gulch								A				P	152,170
Railroad Gulch	P	P	A	A	P	P	P	P			P	P	152,169,170
Pleasant Valley Creek						A	P	A				p	152,170
Duckpond Gulch								P				p	152,170
South Fork Albion River	P	A	P	P	P	P	P	P			P	P	95,152,169,170
Little North Fork South Fork Albion River						A	A	P				p	152,170
Bull Team Gulch													
Railroad Gulch (=East Railroad Gulch)								P				P	152,170
Tom Bell Creek							P	P				A	152,170
North Fork Albion River						P	P	P				p	95,152,170
Soda Springs													
Marsh Creek (=March)													
unnamed tributary								P				p	152,170
unnamed tributary (=Slaughterhouse gulch)								P				A	152,170
Little Salmon Creek													
unnamed tributary													
Big Salmon Creek					P	P	P	P	P	P	P	P	57
Donnelly Creek					P	p	P	P	P	p	p	P	57
Hazel Gulch					P	p	P	P	P	P	P	A	57
West Branch Hazel Gulch													
Navarro River						A	A	A				A	152,170
Marsh Gulch						A	A	P				p	152,170
Murray Gulch						A	P	A				A	152,170
North Fork Navarro River						p	p	P	P			p	95,152,170
Dead Horse Gulch						A	A	A				p	152,170
Tramway Gulch						A	A	A				A	152,170
Flynn Creek						A	P	P				P	152,170
Camp 16 Gulch						A	A	P				A	152,170
Tank 4 Gulch (=Tank Ford)						A	P	P				A	152,170
North Fork Flynn Creek (location?)													
North Branch North Fork Navarro River						P	P	P				p	95,152,170
Cook Creek						A	P	P				A	95,152,170
John Smith Creek						P	P	P				p	95,152,170
Little North Fork Navarro River						A	A	P				p	95,152,170
South Branch North Fork Navarro River			A			P	A	P				A	95,152,170
Bridge Creek								A				A	152,170
Mill Creek													
Indian Creek													

Stream	Modern presence												References
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
North Fork Indian Creek							A	A				A	152,170
Gut Creek													
Dick Creek													
Anderson Creek													
Robinson Creek								A					95
Rancheria Creek						A							95
Ham Canyon													
Horse Creek													
Minnie Creek													
Camp Creek													
German Creek													
Greenwood Creek		A		A	A	A	A	A				A	152,169,170
Elk Creek		A		P	A	A	A	A				A	152,169,170
South Fork Elk Creek							P	A				A	152,170
Three Springs Creek						A	A	A				A	152,170
Soda Fork Creek						A	A	A				A	152,170
Sulphur Creek (=Sulphur Fork)						A	A	A				A	152,170
Mallo Pass Creek						A	A	A				A	152,170
Brush Creek													
Garcia River						A	A	A				A	57,95,152,170
South Fork Garcia River	A		A	A	A	P	A{A}	P{p}				A	95,152,153,169,170,187
Fleming Creek	A	A	A	A	A	A	A	A				A	95,152,169,170
Schooner Gulch							A	A				A	152,170
North Fork Schooner Gulch													
Fish Rock Gulch													
Sonoma County													
Gualala River													
North Fork Gualala River													
Little North Fork Gualala River	A	A	A	A	A		A			A	A{A}	A	95
Doty Creek													
South Fork Gualala River													
Buckeye Creek							A						95
Franchini Creek							A						95
Wheatfield Fork Gualala River						A	A					A	152,170
Fuller Creek						A	A					A	152,170
North Fork Fuller Creek													
South Fork Fuller Creek													

Stream	Modern presence												References
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
Haupt Creek						A	A					A	152,170
House Creek													
Marshall Creek													
Sproule Creek													
Fort Ross Creek													
Russian Gulch													
Middle Branch Russian Gulch													
East Branch Russian Gulch													
Russian River													
Jenner Gulch										A			65
Willow Creek		P	A	A	A	A	p	A		A		A	65,152,169,170
Sheephouse Creek								p		A			65
unnamed tributary													
Freezeout Creek						A	p	A				A	65,152,170
Austin Creek							A						65
Kohute Gulch													
Kidd Creek													
East Austin Creek								A					65
Gilliam Creek								A					65
Gray Creek								A					65
Ward Creek								p					
Red Slide Creek													
Dutch Bill Creek									A				65
Hulbert Creek									A				65
Mission Creek									A				65
Green Valley Creek					p	p	P	P	P		p		65,76,174,175
Purrrington Creek						p							65
unnamed tributary													
Mark West Creek					p	p	p	A	A		A		65,76,175
Laguna de Santa Rosa						p							174
Santa Rosa Creek (location?)					p	p	A						174,175
unnamed tributary (=Griffen Creek; location?)							p						65
Mark Slide Creek (location?)													
Dry Creek													
Mill Creek							P	A					65
Felta Creek													
Wallace Creek							A						65
Palmer Creek								A	A				65
Pena Creek										A			65

Stream	Modern presence												References
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
Warm Springs Creek													
Maacama Creek					P	p	p{P}	A	A		A		65,77,174,175
Redwood Creek					P	p	A	A	A		A		65,77,175
East Fork Russian River													
York Creek													
Forsythe Creek											A		65
Seward Creek											A		65
Eldridge Creek											A		65
Jack Smith Creek							A	A			A	A	65,152,170
Mill Creek											A		65
Salt Hollow Creek													
Rocky Creek													
Mariposa Creek													
Fisher Creek													
Corral Creek													
Scotty Creek													
Salmon Creek													
Finley Creek													
Coleman Valley Creek													
Fay Creek													
Tannery Creek													
Valley Ford Creek													
Coastal Marin County													
Walker Creek								A					
Salmon Creek								A					
Arroyo Sausal Creek													
Lagunitas Creek			P		p	P	P{P}	P{P}	P{P}	P{P}	P{P}	P{P}	5,231,238,239
Haggerty Gulch Creek													
Olema Creek						{P}	{P}	{P}	P{P}	P{P}	P{P}	{P}	5,232
Quarry Gulch									{p}	P	P		17,18,232
Giacomini Creek									{p}	P	p		17,18,232
Nicasio Creek													
Devils Gulch Creek			P		P	P	P{P}	P{P}	P{P}	P{P}	P{P}	P{P}	5,238,239
San Geronimo Creek			P{P}		P	P	P{P}	P{P}	P{P}	P{P}	P{P}	P{P}	5,238,239
Bolinas Lagoon													
Pine Gulch Creek									P	A	A		17,18,232
Redwood Creek				P	P	P	P{P}	P{P}	P{P}	P{P}	P		80,229

Stream	Modern presence												References
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
Unnamed tributary (=Kent Creek)									{p}	{P}			17,18,232
Unnamed tributary (=Fern Creek)									{P}	{A}			17,18,232
San Francisco Bay													
Alameda Creek													
San Pablo Creek													
Walnut Creek													
Corte Madera Creek								A					184
San Anselmo Creek													
Mill Valley Creek													
San Mateo County													
San Gregorio Creek									A				185
Pescadero Creek							A		A	A	A	A	185
Peters Creek							A		A	A	p	A	185
Butano Creek							A						185
Gazos Creek				A		P	P	P	A	P	P	A	228
Santa Cruz County													
Waddell Creek				P	P	A	P	P	A	P	P	A	228
East Branch Waddell Creek													
Henry Creek													
Scott Creek				P	P	P	P	P	P	P	P	P	228
Big Creek											A		185
San Vicente Creek								p	A	A	P	A	185
San Lorenzo River						A	A	A	A	A	A	A	3
Hare Creek													
Soquel Creek													
Aptos Creek								P	A	A	A	A	185
Monterey County													
Carmel River								A					1
Big Sur River								A					1

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